

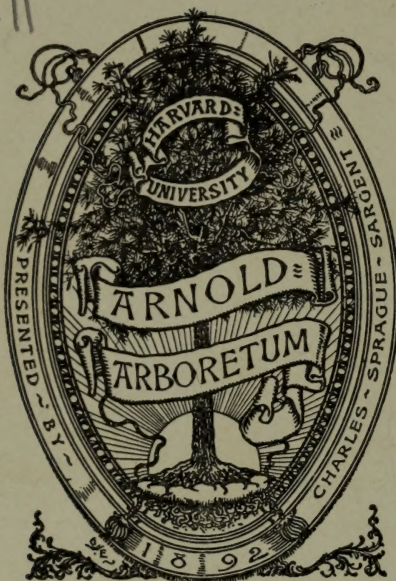


3 2044 105 172 571

H.I.

HII

GRAY HERBARIUM



DEPOSITED AT THE
HARVARD FOREST
1941



THE HAWAIIAN FORESTER AND AGRICULTURIST

JANUARY, 1922

CONTENTS

	Page
Editorial	1
Mauna Kea Plant List	2
Insect Problems of the Pineapple Industry	5
Division of Forestry	13
Division of Entomology	17
Division of Plant Inspection	19
Division of Animal Industry	21

^{xix}
VOL. XXIX

PRICE, TEN CENTS NO. 1

ARNOLD ARBORETUM
JAMAICA PLAIN,

MASS.



The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 207, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy ; \$1.00 a year ; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,

W. M. Giffard,

H. M. von Holt,

A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*

J. P. Pico, *Forest Ranger for Waiaae-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. B. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

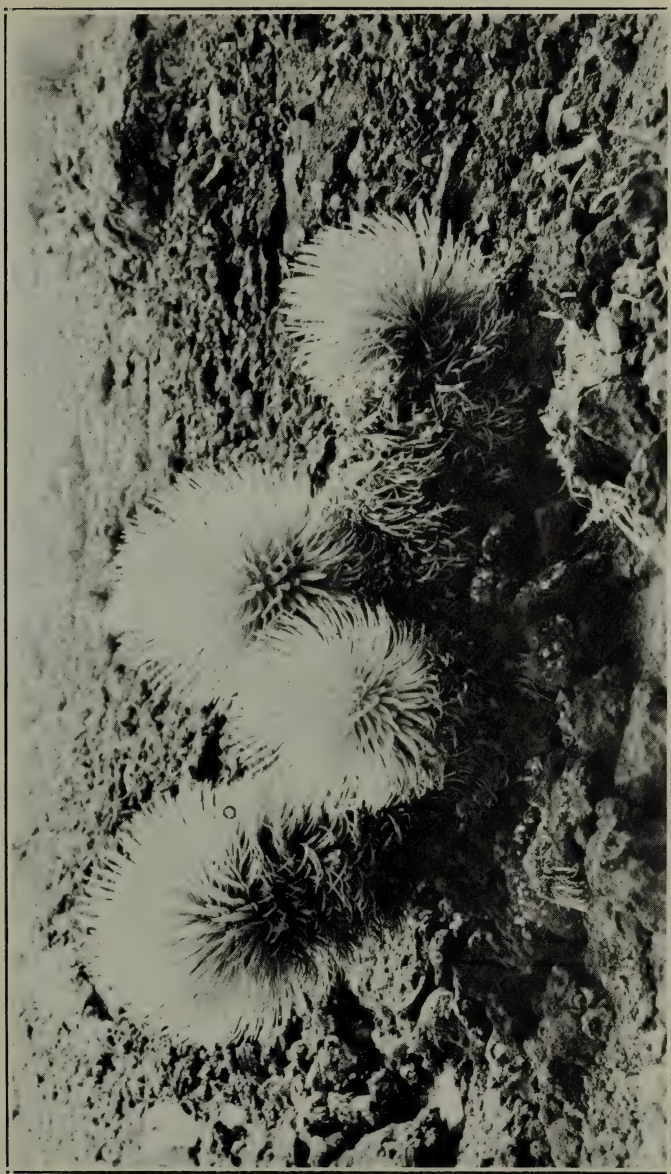
Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss D. Ruttman, *Stenographer.*



Silversword plant in a cinder cone on Mauna Kea at about 10,000 feet elevation. The larger branch at left is 20 inches in diameter and 36 inches high.

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XXIX.

HONOLULU, JANUARY, 1922.

No. 1

Good progress is being made in the construction of new fences on the readjusted boundary of the Hilo Forest Reserve on the island of Hawaii.

During November three more consignments of tumble-bugs were received from our Field Entomologist in Arizona for use in the hornfly control.

Entomologist Fullaway's article in this issue on insect problems will be of interest to all pineapple growers throughout the tropical world.

The Boy Scouts in Troop 4 of the Honolulu Area have undertaken to reforest with koa trees the open grassy slopes just below the summit of Tantalus in the Honolulu Watershed Forest Reserve.

Arbor Day was celebrated on November 18, 1921, by appropriate exercises in the schools and by the planting of trees. For the latter purpose the five main nurseries of the Division of Forestry distributed 6,384 trees throughout the Territory.

The fruit orchard at Keanakolu, Hawaii, at an elevation of 6,000 feet on the slopes of Mauna Kea, which has lately been pruned and cleaned up, shows the possibility of producing temperate zone fruit such as apples, cherries, plums and pears at proper elevations in these islands.

In the list of plants encountered on a trip up Mauna Kea on the island of Hawaii by Mr. Kraebel and printed in this number, it is interesting to note that over 40% is composed of introduced plants, mostly grasses. This list should serve as a handy reference for the plants of this region.

Mr. Lester W. Bryan, Forest Supervisor of the H. S. P. A. was on November 9, 1921, commissioned as Honorary Forest Ranger for this Board. Mr. Bryan has been working in close cooperation with us on the Hilo Forest Reserve with good results and his appointment will clothe him with the necessary authority to enforce the regulations pertaining to government lands in forest reserves.

MAUNA KEA PLANT LIST

C. J. KRAEBEL, *Asst. Superintendent of Forestry.*

The list of plants here presented is merely an elaboration of a list which was casually made in May, 1921, during a trip with the botanist J. F. Rock up the northeast slope of Mauna Kea, on the Island of Hawaii. The list covers the region from Kukaiau to the limit of abundant vegetation at about 10,000 feet, the route carrying past Keanakolu and Puu Kihe. From its very casual nature the list does not pretend to be a complete botanical transect of the region covered and is published for what interest it may have to ranchers and to botanists and travellers in the region. An interesting feature is the considerable number of introduced plants, over forty per cent of the entire list, which are now well established on the mountain. It will be noted from the key letters, however, that these are all grasses and herbaceous plants, many of them worthless weeds, which have been introduced with forage grass seeds in the process of range improvement, Ornamental plants at ranch stations and the numerous plantations of Eucalyptus set out in the region were not considered.

For the identification Mr. Rock was the principal authority, and it was, in fact, his characteristic habit of constantly calling out the name of any plant seen for the first time in the day that suggested making the list. The purpose of the trip was to secure seeds of the akala, the large native raspberry, for propagation by the United States Bureau of Plant Industry, and also a specimen of silversword for the National Museum at Washington. An article on the akala berry, illustrated with photographs taken on this trip, was published by Mr. Rock in the *Journal of Heredity* for April, 1921, Volume XII, No. 4.

For the sake of brevity the following key letters are used to describe the plants, and it is in these brief descriptions that the interest lies:

G—grass	T—tree	w—weed
H—herb	F—fern	N—native
S—shrub	f—forage plant	I—introduced
t—small tree	p—poisonous	

SCIENTIFIC NAMES	ENGLISH NAMES	HAWAIIAN NAMES	KEY LETTERS
<i>Acacia koa hawaiiensis</i> ...	Koa on Hawaii		
	Island	Koa	T - N
<i>Achillea millefolium</i> ...	Common Yarrow,		
	Millefoil		H w I
<i>Agrostis plumosa</i>	Bent Grass		G - I
<i>Alsine sp.</i>	Sandwort		H w I
<i>Anagallis arvensis</i>	Red Chickweed;		
	Poisonweed		H w p I
<i>Antidesma platyphyllum</i>	Haa, Hame ..		T - N
<i>Argemone mexicana</i>	Mexican Poppy	Puakala	H w N
<i>Argyroxiphium sand-</i>			
<i>wicense</i>	Silversword	Ahinahina	H - N
<i>Asplenium adiantum</i>			
<i>nigrum</i>	Mountain Fern		
	(7000 feet)	Iwaiwa	F - N

SCIENTIFIC NAMES	ENGLISH NAMES	HAWAIIAN NAMES	KEY LETTERS
<i>Aspidium felix-mas</i>	Male Fern	Io nui	F - N
<i>Aspidium hawaiiense</i>			F - N
<i>Asplenium monanthe-</i> <i>num</i>			F - N
<i>Briza minor</i>	Quaking Grass		G - I
<i>Bromus</i> sp.	Brome Grass		G - I
<i>Camilla</i> sp.			H w I
<i>Chenopodium ambro-</i> <i>sioides</i>	Mexican Tea		H w I
<i>Cirsium lanceolatum</i> ...	Bull Thistle		H w I
<i>Coprosma ernodioides</i> ..	Goosedroppings	Kukai nene ..	S - N
<i>Coprosma montana</i>		Pilo	t - N
<i>Coprosma rhynchocarpa</i> ..		Pilo	T - N
<i>Cynodon dactylon</i>	Bermuda Grass	Manienie	G f I
<i>Dactylis glomerata</i>	Orchard Grass		G f I
<i>Deschampsia australis</i> ..	Hair Grass		G f N
<i>Deyeuzia</i> sp.	Native Grass		G - N
<i>Drynaria cardata</i>			H w I
<i>Emilia sonchifolia</i>			H w I
<i>Eragrostis atropioides</i> ..	Native Grass		G - N
<i>Eragrostis plumosa</i>	Asiatic Grass		G - I
<i>Erigeron albescent</i>	Fleabane		H w I
<i>Erythraea sabaeoides</i>	Native Gentian	Awiiwi	H w N
<i>Euphorbia lorifolia</i> ..	Hawaiian Rubber ..	Koko, Akoko ..	T - N
<i>Euphorbia peplus</i>	Petty Spurge		H w I
<i>Fragaria chilensis</i>	Wild Strawberry ...	Ohelo papa ..	H w N
<i>Geranium carolinianum</i> ..	Wild Geranium,		
	Cranesbill		H w I
<i>Geranium cuneatum</i>	Mountain Geranium ..	Nohuanu	S - N
<i>Gnaphalium japonicum</i> ..	Cudweed		H - I
<i>Gnaphalium luteoalbum</i> ..	Yellow Cudweed ...	Enaena	H - N
<i>Gnaphalium purpureum</i> ..	Purple Cudweed		H w N
<i>Ilex anomala</i> v. sand- <i>wicensis</i>	Hawaiian Holly	Kawau, Aiea ..	T - N
<i>Juncoides campestre</i>	Wood Rush		H w N
<i>Koeleria glomerata</i>			G f N
<i>Lepidium virginicum</i> ...	Peppergrass, Bird's Pepper		H w I
<i>Lythrum maritimum</i>	Loosestrife	Ninika	S - N
<i>Metrosideros collina</i> <i>polymorpha</i>	Lehua Tree	Ohia lehua ...	T - N
<i>Myoporum sandwicense</i> ..	Bastard Sandalwood ..	Naio	T - N
<i>Osmanthus sandwi-</i> <i>censis</i>	Hawaiian Olive	Pua, Olopua ..	T - N
<i>Parmelia perlata</i>	Lichen on Rocks	Unahe	N
<i>Paspalum dilatatum</i>	Paspalum		G - I
<i>Pellaea ternifolia</i>	Xerophytic Fern ...	Laukahi	F - N
<i>Physalis peruviana</i>	Ground Cherry	Poha	H w I
<i>Pisonia inermis</i>		Papala kepau ..	T - N
<i>Poa pratensis</i>	Kentucky Bluegrass ..		G f I
<i>Pteris aquilina</i>	Bracken, Brake Fern ..	Kilau	F - N
<i>Raillardia arborea</i>		Naenae	t - N
<i>Raillardia juniperioides</i> ..		Naenae	S - N
<i>Raillardia struthioloides</i> ..		Naenae	S - N
<i>Rhus semialata</i> v. <i>sandwicensis</i>	Hawaiian Sumach ..	Neneleau	t - N
<i>Rubus jamaicensis</i>	Thimbleberry (Hitchcock Berry) ..		S - I
<i>Rubus macraei</i>	Wild Raspberry	Akala	S - N
<i>Rumex acetosella</i>	Sheep Sorrel		H w I

SCIENTIFIC NAMES	ENGLISH NAMES	HAWAIIAN NAMES	KEY LETTERS
<i>Rumex giganteus</i>	Climbing Dock	Pawale Uhauhako ..	S - N
<i>Sanicula sandwicensis</i> ..	Sanicle, Snakeroot		H - N
<i>Scrophularia</i> sp.	Figwort		H w I
<i>Senecio vulgaris</i>	Groundsel		H - I
<i>Silene anglica</i>	English Catch-fly		H w I
<i>Silene struthiolides</i>	Catchfly, Champion		S - N
<i>Sisymbrium officinale</i> ..	Hedge Mustard		H w I
<i>Sisyrinchium acre</i>	Blue-eyed Grass		H w N
<i>Sonchus oleraceus</i>	Sow Thistle	Pualele	H - N
<i>Sophora chrysophylla</i>		Mamani	T - N
<i>Sporobolus indicus</i>	Smut Grass		G f I
<i>Sporobolus virginicus</i> ..	Virginia Rush Grass.....		G - I
<i>Stenogyne rugosa</i>	A Creeping Shrub ..	Maohiohi	S w N
<i>Straussia hawaiiensis</i> ..	Red Kopiko	Kopiko ula ...	T - N
<i>Styphelia grayana</i>	Hawaiian Heather (High mtn. form) ..	Puakeawe Kawau	S - N
<i>Styphelia tameiameia</i> ...	Hawaiian Heather ..	Puakeawe Kawau, Maiele	S - N
<i>Suttonia lessertiana</i>	Pink-veined Kolea ..	Kolea	T - N
<i>Taraxacum officinale</i> ..	Common Dandelion		H f I
<i>Tetramolopium humile</i> ..	Hawaiian Fleabane		H w N
<i>Trifolium repens</i>	Sweet White Clover.....		H f I
<i>Usnea australis</i>	Lichen on Trees		N
<i>Vaccinium fauriei</i>	Hawaiian Huckle- berry	Ohelo	S - N
<i>Vaccinium reticulatum</i> ..	Hawaiian Huckle- berry	Ohelo	S - N
<i>Verbena bonariensis</i>	Vervain	Oi	H w I



Akala Berries, the wild Hawaiian Raspberry grown at 5,500 feet.
The white disk is a half dollar.

INSECT PROBLEMS OF THE PINEAPPLE INDUSTRY.

By D. T. FULLAWAY.

I do not know what Mr. White had in mind when he injected the word "problem" into the title of my subject, but I am glad he did so, for it gives me latitude to express a conviction which I have had for some time but did not know anyone shared with me, namely, that the insects are going to prove a problem if measures are not taken to restrain them. I have hitherto considered the pineapple growers more fortunate than other crop producers in regard to losses occasioned by insects, for while the mealybug and the scale and a few minor pests have always had to be contended with, the damage which they have done in the past has been on the whole insignificant. But the alarming outbreak of the fruit beetle last spring and the red spider scare this fall, coupled with the statement of Mr. Horner in regard to ants, lead me to believe that, in the rapid expansion of the industry, too little attention has been paid to the insects, and their capacity for harm is not realized. As compared with other crops, however, I think it can still be maintained that the pineapple crop enjoys a remarkable freedom from injury by insects, and nothing of a distressing or calamitous nature should be anticipated from my previous remarks.

As most of you, I presume, are aware, nearly all of our injurious insects are non-indigenous species, which have been brought to our shores on commercial shipments or along with plants introduced as stock for propagation; and among them are a host of species which are indiscriminate in their feeding habits. Cutworms, wireworms, grasshoppers, fruit-flies and the Japanese beetle are examples. Many of our crops suffer severely from the attacks of insects of this sort. The pineapple plant, however, is never, or scarcely ever, touched by them. The reason for this, in my opinion, is found in the nature of the plant. I believe it is unattractive to them. The insects which we find on the pineapple—such as the mealybug, scale, and red spider—are considered to be closely associated with the plant. They are found on the pineapple in other countries and have evidently been brought here on plants introduced for propagation before there was any industry and (in the case of the two first, anyway) before we had a plant quarantine. There are also other insects, of much greater import, attached to the pineapple plant in other lands, the beetle borer of the West Indies, and the fruit fly of the South Seas, which has now reached as far north as Fiji, for example, but the likelihood of their reaching these Islands is now very remote. I judge, in view of the close and careful scrutiny given to plants which are brought into the Islands, and the probability that we

shall soon have in force a legal prohibition on the importation of any more pineapple plants. If my estimation of the situation is correct, then it appears that the chief aim and purpose of the pineapple growers should be to keep the present insect population of their fields at a low level, and the question arises, Can it be done under the stress of a rapid expansion, accompanied as usual by a striving for maximum production with minimum effort and expense? I will develop this point more, later.

In the meantime let me tell briefly as possible what is known of the nature and habits of our present pineapple pests.

I will discuss the mealybug first. This insect, while invariably found on the pineapple and known as a pineapple pest for many decades, is not confined strictly to the pineapple. It is also found on sugar cane, bananas, roots of grasses, and some other plants. You are probably all familiar with this insect, for it has a characteristic appearance and is recognizable at once. It is a small, louse-like creature with a white waxy covering, secreted from glands lying under the derm and poured out in beautifully arranged filaments. It is most commonly found in clusters at the base of the fruit or leaves, where the adults congregate to produce young. The young come from eggs which are hatched within the body of the female. The progeny of one individual is commonly from fifty to one hundred. For a time they rest beneath the body of the mother, but gradually they move out and their naked bodies soon develop a waxy covering. The younger individuals are rather flat. They are active also, and have a tendency to disperse over the plant, so that they are often found scattered through the crown or over the outer portion of the leaves. They are sometimes found also on the stem and roots. The insect moults its skin a number of times during its development to accommodate its enlarging body, but the actual number of moults has not yet been accurately determined. Growth proceeds slowly. Several months are consumed in reaching the adult stage, so that only a few generations can occur during the year. Mature individuals have rather swollen bodies, and their tendency is to hide in obscure parts of the plant, particularly where the epidermis is very thin. This habit is responsible for their being more destructive than the scale, as I shall presently explain. Males are sometimes seen. Their cocoons are elongate and loosely constructed of white waxy filaments. Their occurrence, however, is very uncommon, and I believe the insect reproduces itself for the most part asexually. While there are many mealybug enemies, they are not seen to any great extent on the pineapple plant, and the colonies of the mealybug found in sheltered spots usually appear to be in a flourishing condition, never mussed up as if they had been disturbed by these enemies. Occasionally the mealybug-devouring Coccinellid or ladybird beetles, *Cryptolaemus montrouzieri* and *Scymnus bipunctatus* are observed on the plants searching for food, and I have more than once seen

their larvae, which are also predaceous upon mealybugs, on heavily infested fruits; but it is not at all a common occurrence.

The scale, I believe, is confined strictly to the pineapple plant, and has been known for nearly a century and a half. It was described first in 1778. While a near relative of the mealybug, it is totally dissimilar in appearance. This is owing to the peculiar character of its waxy covering. Aside from the fact that the body of the real insect is vastly smaller, the secretion does not remain fluffy, but hardens and compacts, assuming at the same time an almost flat surface and a circular outline. The scale is found most commonly on the leaves of the pineapple plant. Its young come from eggs, which are hatched beneath the scale. They are yellowish white, oval and a fourth of a millimeter long. The eggs of one female number commonly from fifty to seventy-five and hatch after five or six days from date of extrusion. The newly hatched louse is very small, flat, oval, orange-yellow colored and bare of covering, possessing functional legs so that it is capable of moving off to find a suitable location for its future development. When this is found, however, it becomes sedentary, developing a tough scale over its soft and tender body. Thenceforth its legs are functionless (disappearing at the first moult) and its powers of locomotion are restricted. The first scale is very small and consists only of the thickened cuticle and some fluffy wax curling upward from the margin. Growth proceeds very slowly and is outwardly manifested by the gradual enlargement of the scale. The skin is moulted twice (in the case of the female insect) to accommodate the expanding body, and these exuviae are incorporated in the waxy material of the scale appearing at the front end. The first moult occurs in about 15 days, the second 17 days later; the third instar is the longest, occupying usually 25 to 30 days. Thus four generations can occur in a twelvemonth. The males of this species are quite numerous and are distinguishable after the first moult, when this form enters a pupal state, the body becoming attenuate to some extent and the waxy portion of the test covering it, assuming the same elongate form with three prominent longitudinal ridges. After twenty-five days the pupa transforms into the adult male insect, which emerges from the test by a longitudinal rent in its side. In addition to legs and antennae this form possesses functional wings and is capable of flying. Its powers of flight are very feeble, however, and it is oftenest seen crawling over the plant, seeking the females, in order to mate with them and give fertility to their eggs.

The scale insect is often destroyed by internal parasites, particularly by species of *Aphelinus* and by *Aspidiotiphagus citrinus*, and occasionally some one of the scale-feeding Coccinellid or ladybird beetles is seen working upon infested plants.

Now, I have said that the scale and the mealybugs are closely related insects. They belong to the same family, namely, Fam.

Coccidae (Hemiptera, or true bugs). Notwithstanding the many superficial differences which distinguish them, their structure is essentially similar. One of the most striking features of this structural similarity, shared also by the leaf-hoppers and the aphids, two other families of plant lice common in Hawaii, is the character of the mouthparts; and as this determines the manner in which the insect gains its sustenance from the plant and also has an important bearing on the means of controlling insects of this type, it is perhaps worth while at this point to give some consideration to the structure of the mouth. The type of mouthparts possessed by the greater number of injurious insects (beetles and caterpillars, for example) is what is known as "cutting and biting mouth parts," the main feature of which is the apposed heavy-knife-edged jaws which tear and rend the plant tissue to fragments so that they can be gathered together by the remaining parts, ground and swallowed. The plant where the insect is feeding is entirely consumed. Not so, however, with the plant louse. Its mouth parts, while homologous throughout, are different both in structure and purpose. Instead of the heavy lamellate jaws, there are apposed long slender stylets or filametous rods with grooved or channelled inner surfaces forming a piercing and sucking organ, with the pharyngeal pump behind them, and instead of organized tissue, unorganized tissue is consumed. That is to say, the fluid contents of the cells, referred to loosely as the juice of the plant, is sucked out of it, and the solid matter suspended in it is strained out in the alimentary tract of the louse and constitutes its food. Inasmuch as they take only a solution of food, obviously large quantities of the juice of the plant must be absorbed to meet the requirements of their growing bodies, but unless the infestation of these insects is very severe and they are present in extremely large numbers, their feeding does not prove much of a drain on a succulent plant like the pineapple—on tender leaves, yes; but on a hardy, succulent plant they make little impression except when they are numerous. The chief injury resides in the puncture of the epidermis of the plant, for this furnishes an entrance for the spores of pathogenic organisms, which often invade the tissues and quickly destroy them. Unfortunately the pineapple is very susceptible to some rapidly-developing rots, which thus gain access to the plant, so it should be apparent that it is very essential that these insects be discouraged from multiplying on the plant just as much as possible.

Another feature of the life of these insects which should not be overlooked is their close association with ants. This and several other related families of insects are peculiar in the respect that their representatives uniformly excrete a sugary fluid known as honey-dew, which many ants find good provender. The ants have become so habituated to this food that they tend the insects in much the same way as man does his domestic animals, and it is often the case that in waging war on the scale insects, et cetera,

you immediately become involved with the ants. It is a well authenticated fact that the ants protect their benefactors from the attacks of parasites, and in the case of the mealybug of the pineapple, they minister to their comfort still further by providing the semi-obscurity which this species desires by packing up pellets of soil to roof them over. You can see this at any time on a pineapple fruit. And this feature of their association is responsible for greater damage to fruit than any other single cause. The covering of dirt, by shutting off the evaporative influence of the surrounding air, causes moisture to collect on the surface of the fruit, which softens the skin, causes it to break and thus induces rot. They also habitually run along the roots and are responsible for some of the retardation of growth which results from root destruction. Ant infestation is more noticeable in summer months than in winter, as the cold, wet weather and flooding which occurs during the winter months undoubtedly weaken ant colonies, and this decimation is certainly reflected in the reduction of mealybug infestation during the winter months. Ant infestation increases with the age of the fields, and when the fields become so overgrown that cultivation is no longer practical, they make the mealybug control problem extremely difficult.

Now, I believe I have shown that these two enemies of the pineapple are capable of causing considerable injury to the plants, particularly the fruits, and it seems to me a natural corollary that they should be prevented from accomplishing this result if possible. As the insects suck their food from the cells of the plant, naturally they cannot be reached by a stomach poison like arsenic. It is therefore necessary to use other means of killing them, either poisonous gases or vapors, caustics, asphyxiation by a mechanical stoppage of their breathing apparatus or washing them off their hosts. But here the question arises, To what extent does this injury go; and provided it can be stopped, will the effort required to effect the purpose pay? That is to say, does the damage expressed in loss of fruit amount to as much as it would be necessary to expend in labor and materials to prevent it? That is entirely a practical question which can only be answered after experimentation. We are trying to arrive at some conclusion in this regard at the present time. My only excuse for not having complete data already is that hitherto little interest has been displayed in the matter. I presume other factors in the production of fruit have proved of greater and more vital importance to the industry, and have crowded out a consideration of this one. I know that for some years it was a common practice to use tobacco dust to discourage the mealybug. It has been conceded that the effect was salutary. But the practice was discontinued, probably because other field operations absorbed all the labor and material which could be applied. I have recently experimented on a large scale with three different contact insecticides applicable to the mealybug and scale, namely, nicotine,

mineral oil and sulphur. The nicotine was applied as tobacco dust, tobacco decoction, water diluted nicotine sulphate and nicotine sulphate with sulphur and an inert dust. The mineral oils used were kerosene and distillate emulsified with ivory soap and whale-oil soap. The sulphur was applied as a dust and as an aqueous liquid in combination with lime. All liquid applications were sprayed on to the plants with the aid of a knapsack spray pump and through a Vermorel nozzle. Dusts were applied with a patent dusting machine, except in the case of tobacco dust, where it was sometimes applied by hand. Each of these applications has its individual merits, some their detractions, and none of them cleared out the insects entirely. I believe the tobacco decoction with soap gave the most satisfactory results, and I believe it could be applied along with the iron sulphate given to the plants with as good results and more cheaply than when each would be applied separately. The aim was to kill the insects without burning the plant, and therefore it was necessary to establish a minimum and maximum limit upon the concentration of the liquid applications. With the dusts it was necessary to limit the quantity placed in the heart of the plant, particularly during cold, wet weather, when its vitality is weakened by the loss of roots, in order to avoid setting up rots at this point. It was easily demonstrated that the immature forms could be killed with any one of the insecticides used, but mature individuals often proved resistant; and it is too obvious to be denied that many individuals escape the action of the insecticide at each application. The treatment, therefore, to be effective, must be continued throughout the growth of the plant, at regular intervals, which should be closer during the summer months than through the winter, because of the greater prevalence of the insects during the summer months, when they are favored by meteorological conditions. The effect, I believe, would be to keep the insects constantly at a low level and prevent in a measure the baneful influence of an accumulation of individuals so evident in old fields. I am also strongly of the opinion that a search for parasites and predators of these two insects in the regions where they are supposed to be indigenous would yield results of great benefit to the industry, and if I am supported by the pineapple interests I intend to urge the Government to undertake this much-needed work. We are supporting a man in Mexico at the present time, and if he has sufficient time at his disposal and funds are available when he has finished the work at present in hand, he will proceed to the Gulf Coast and investigate this matter, anyway.

The pineapple mite or red spider is apparently another strict parasite. I do not know of its being found on any other plant than the pineapple. While its presence in the Islands was reported as far back as 1908, it is only in the last planting season that its injuries have come to our notice. Red spiders really do

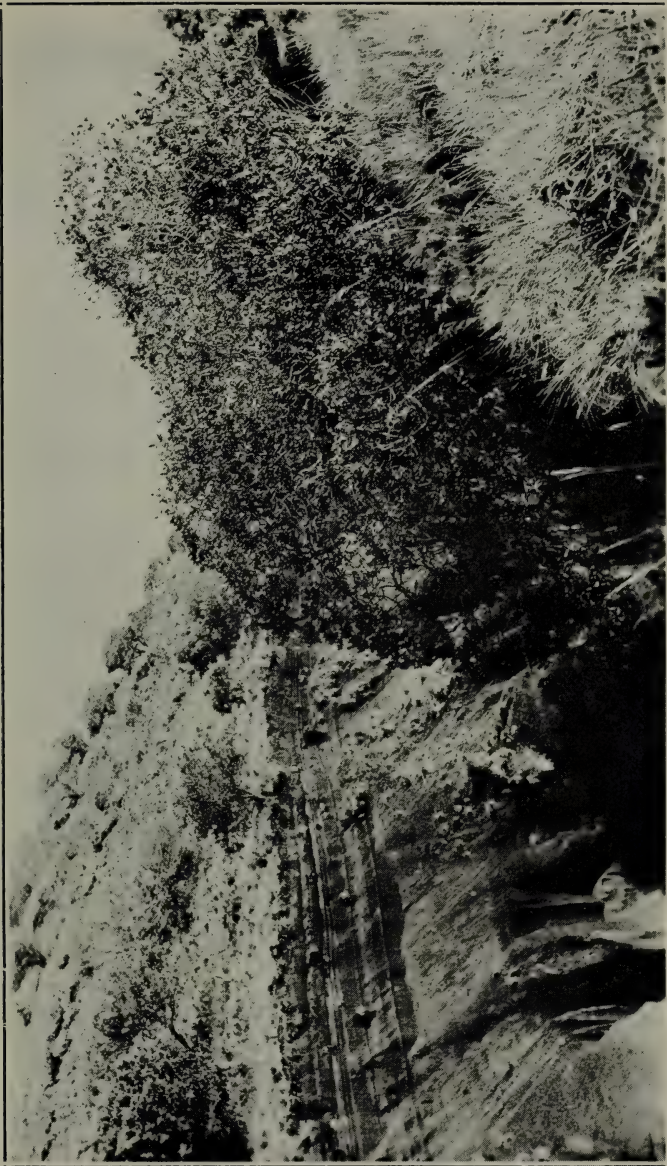
not come within the scope of this treatise, as they are not insects, but because it usually falls to the lot of the economic entomologist to deal with them, and particularly on account of their novelty here in connection with pineapples, and their great economic importance, I have decided to include them in the discussion. Their real affinity, however, is with the true spiders, scorpions, ticks, et cetera. From insects they are distinguished by the possession of four pairs of legs (in the adult) and only two divisions to the body. Insects never have more than three pairs of legs, and the trunk of the body is always divided into three parts.

The young of red spiders arise from eggs, which are laid, in the case of the pineapple red spider, on the surface of the leaf. The mouthparts are adapted for biting. The pineapple mite was first discovered in Florida, in 1899. It is known to have come here on plants from Florida on several occasions in recent years, when the plants were destroyed; probably the first to reach the Islands also came in this way. This furnishes an excellent example of the value of strict quarantine, and also shows the folly of introducing plants from abroad except under the most careful supervision to be exercised by those conversant with the risks so taken. The infestations which I have seen have been usually at the base of the leaves, where they are most completely imbricated and tightly clasped to the stem. The mites seem to flourish best in these situations, usually occurring in colonies in which are found all stages—eggs, larvae, and adults. While they are almost microscopic in size, they are readily discerned, or at least their presence is indicated by the reddish coloration given to the blanched tender tissue by their scarifying trophi. As in the case of the mealybug and scale, the most potent effect of their injuries is the entrance of spores of pathogenic organisms through the wounds which they inflict. They are very much protected in the situations in which they are found from dusts and liquid applications, which would undoubtedly be effective if they could reach their object, and are known to be beneficial where the mites are so numerous that they have to spread to the more exposed surfaces of the leaves. Sulphur appears to be the most effective lethal agent, applied either as a fine dust or in combination with lime as liquid lime-sulphur. It was supposed that however well mites might conceal themselves, they could be reached by confined poisonous gases, but this method, which appeared to be particularly well adapted to the treatment of slips, suckers and tops intended for planting, has proved unreliable. Whether mites are peculiarly resistant to asphyxiation, or whether the gases fail to penetrate during their maximum concentration, has not been determined, but so far the results of fumigation have been disappointing, as all individuals are not killed even when the concentration of the gas is pushed beyond the limit of safety to the plants.

Since the discovery of the Florida species, *Stigmaeus floridanus*, two other species of mites have been found commonly on pineapples, one a species of *Tarsonemus*, probably the *T. anasae*, described by Tryon, in Queensland, Australia, and mentioned as injurious there; the other a species of *Tyroglyphus*, a fungus-eating acarid, a congener of which is also mentioned by Tryon in reporting on the mite-infestation of Queensland pineapple plants.

While I am referring to these incidental infestations, I may also speak of several other insects which occasionally do slight damage to the plant. My attention has repeatedly been called to a leaf injury which I have traced to a very common grasshopper here. The injury is so inconsequential, however, that it is hardly worth mentioning. I have also recently seen an injury to the hearts of slips and suckers caused by the larvae of a very common ground beetle. And as an instance of how consternating and baleful the undesired presence of a mere scavenger can be, I need only recall the experience of previous packing seasons, particularly the last, with the fruit beetle. Undoubtedly this insect will yield to the measures which are generally used for the suppression of all filth feeders or scavengers, namely, the elimination of the rotting material in which they develop. And this topic leads me naturally to my last consideration, the accumulation of insect life under certain favorable conditions.

As one passes through a pineapple section it is impossible not to notice the sharp contrast between newly planted and old ratoon fields. I wish to impress on you that a closer inspection reveals a contrast just as vivid in the state of the insect population at the beginning and end of the crop. From a meager source, the infestation grows larger and larger, and by the time it becomes necessary to replant on account of the diminution in size of the fruit and overgrown condition of the field, the insect colonies are beginning to have an effect on the growth of the plant. They have accumulated to such an extent that further accumulation would mean its death. Little attention is paid to the matter, however, because the fields are about to be abandoned. I believe these fields have furnished most of the insect troubles of the past year, and represent a condition which challenges the grower's ability to maintain a low level of insect life throughout the fields. I am not urging the elimination of the third or any other ratoon crop, but I do think if the troubles of the past year are to be avoided in the future, corrective measures should be taken and their application apply to the crop throughout its growth, so that the cumulation of which I have spoken could not occur.



Raillardia arborea trees with native and introduced grasses help to check erosion at Puu Kihe, 7,700 feet on Mauna Kea. Associate plants are Mamani and Pukeawe.

DIVISION OF FORESTRY.

REPORT OF SUPERINTENDENT OF FORESTRY, NOVEMBER, 1921.

Honolulu, Hawaii, December 15, 1921.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of November, 1921:

TREE PLANTING.

During the month 2,060 trees were planted out on four different forest reserves as follows:

On Kauai, 232 koa were planted on the Papapaholahola Spring Reserve and 1,028 swamp mahogany on the land of Kalaheo in the Lihue-Koloa Forest Reserve. On Oahu, Ranger Ellis began the marking of a portion of the boundary of the Pupukea Forest Reserve by planting 100 lemon gum trees and similar work was done at Waiahole by the planting of 700 trees of the same species.

Ranger Ellis moved to the Aimuu Ranger Station in the Pupukea Forest Reserve on November 14, and began at once the transplanting into tins of 5,170 koa seedlings which will be used for planting on this reserve during the present season under agreements with pineapple planters.

The chaulmoogra plantation at Waiahole was inspected in company with the Forest Nurseryman on November 28, and the work was found to be progressing favorably. A windbreak has been planted on the makai forest boundary and at the ends of the exposed ridges, about 5 acres of the land have been cleared, plowed, and harrowed, and a part of the 3,000 chaulmoogra trees available for planting have been hauled to the area.

During some boundary marking work on the Mokuleia Forest Reserve, 200 wild alahoe (*Plectronia odorata*) seedlings were secured in Makaleha Valley and brought in to the Government Nursery and potted for future use in planting.

Arrangements were concluded with the Boy Scouts in Troop 4 to establish a koa forest on the grassy slopes just below the summit of Tantalus on the Honolulu Watershed Forest Reserve and they have undertaken to plant and care for the trees for six months at 10 cents per tree.

Two days were spent on the Pupukea Forest Reserve mapping planting areas with the assistance of Mr. A. O. Burkland of the U. S. Geological Survey who very kindly explained intricacies in the use of the telescopic alidade and plane table.

ARBOR DAY.

Arbor day was celebrated this year on November 18, and, as reported by the Forest Nurseryman, a total of 6,384 trees was distributed from our nurseries for planting on the five main islands in commemoration of this day.

FOREST FENCING.

The chief accomplishment in this line was on the recently resurveyed makai boundary of the Hilo Forest Reserve on Hawaii on which a total of 1.79 miles of new fence was under general lease requirements, constructed during the month where the line crosses government lands, as follows:

Gen'l Lease 946, Laupahoehoe Sugar Co. Weloka-Moanalulu .59 miles	
Gen'l Lease 926, Manuel P. Silva, Laupahoehoe, . . . . .	.97 miles
Gen'l Lease 984, Rose de Lima, Hakalau-iki, Lot 51 . . . . .	.23 miles
Total	1.79 miles

In addition to this .57 mile of new fence was constructed in November by the Hakalau Plantation Company on the Hilo Forest Reserve boundary where it crosses the private lands of Hakalau-nui and Umauma. Under a cooperative arrangement with S. Kanamori, 80 posts were set during the month as a part of a new fence on the Olaa Forest Reserve back of 24 Miles, Hawaii.

Arrangements have been made for further fencing along the Hilo Reserve boundary at Lots 16 and 17 of the Opea-Peleau homesteads and at other places.

Fences were repaired during the month as follows:

On the boundary of the Moloaa Forest Reserve, Kauai, by Ranger Lovell .20 mile and on boundaries of Section C of the Olaa Forest Park Reserve, Hawaii, by Ranger Mackenzie 1.67 miles, a total of 1.87 miles.

Two days were spent with Mr. Kraebel and Ranger Ellis in locating and flagging the makai boundary of the Mokuleia Forest Reserve, Oahu, preliminary to making arrangements for fencing the same.

Through cooperation with the Land Office a clause has been inserted in the new lease of the land of Piihonua, Hawaii, whereby the lessee will be required to build and maintain a stock-proof fence on the boundary of the Hilo Forest Reserve where it crosses or is adjacent to the land of Piihonua, a total distance of 3.75 miles.

NEW FOREST RANGER.

Mr. Lester W. Bryan, employed by the H. S. P. A. to work as Forest Supervisor on the Hilo Forest Reserve received his commission from this Board on November 9, and has continued to perform valuable services, as has Ranger Lawrence L. Peralto, in inspecting the progress of fence building, assisting the government surveyor in running out the boundary, flagging and monumenting the boundary of the Hilo Forest Reserve and in planting trees on vacant government lands in this reserve.

KEANAKOLU ORCHARD.

During the month Ranger Bryan pruned and cleaned the fruit trees in the orchard near Keanakolu at an elevation of 6,000 feet near the north-west corner of the Hilo Forest Reserve so that in the future they should yield better crops of fruit. He reports the following trees in this orchard: Cherry 35, apple 22, plum 10, peach 5, pear 5 and apricot 4, total 81 trees.

WATERSHED PROTECTION.

On November 4, in company with Mr. Kraebel, Dr. Lyon, Mr. Caum and others, I made observations along the trail from Palolo Crater to Pauoa Flats via Mt. Olympus and the headwaters of Manoa Valley. Hilo grass was found to be more abundant than ever, along the trail and the conclusion was reached that the closing of this area to the public is urgent if the delicate forest on this important catchment area is to receive proper protection.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY. NOVEMBER, 1921.

Hilo, Hawaii, December 6, 1921.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following routine report of my activities during November, 1921, is respectfully submitted.

The first half of the month was spent on Oahu and the remainder of the month on the Island of Hawaii.

FIELD TRIPS ON OAHU.

On November 4, in company with Mr. Judd, and Dr. Lyon and Mr. Caum of the H. S. P. A. Experiment Station, I made the circuit of the Palolo-Olympus-Tantalus trail, the purpose of the trip being a general inspection of the forest conditions and a particular observation of the spread of Hilo grass along the trail. This undesirable grass has spread very rapidly within the past few years, chiefly as a result of human travel over this particular trail. It seems entirely justifiable therefore to close this portion of the Honolulu Watershed Reserve against all "hikers."

November 7 and 8 were spent with Mr. Judd and Ranger Ellis in the Makaleha Valley region of the Mokuleia Forest Reserve in the Waianae Mountains, the purpose of this trip being to re-locate the forest boundary lines and to determine what amount of fencing will be required to give proper protection to this portion of the reserve. Several hundred natural seedlings of the Alahee (*Plectronia odorata*) were dug up and taken back to the nursery since it is almost impossible to collect viable seed of this species. This tree, because of its dark lustrous foliage and the rich fragrance of its flowers, should be encouraged for ornamental planting on home grounds in Hawaii since it is far more attractive than many shrubs which are now in general use.

On two occasions I drove Mr. Louis von Tempsky, of Maui over the Tantalus Drive for the purpose of showing the extensive plantations of kea, Eucalyptus and other species set out by the Division of Forestry.

MISCELLANEOUS.

On November 3 a class in genetics under Professor Krauss of the University of Hawaii visited the office to learn something of forestry in Hawaii. With the aid of photographs and maps the work of the Division of Forestry and of other forestry agencies was explained at some length.

The remainder of my time in Honolulu was occupied with the data of the coniferous plantations on Mauna Kea and Haleakala, preparation of herbarium specimens, arrangement of samples of Italian cypress seed collected on Maui, and various routine matters.

TRIP TO HAWAII.

On November 16 I went to Hilo to work with Mr. Hockley in finishing the Hilo Forest Reserve boundary survey, and particularly to push the work of fencing this boundary wherever possible. During the month of November the following fences on the forest boundary were completed:

1. Mauka boundary of Gen. Lease No. 946 to the Laupahoehoe Sugar Company, lands of Weloka, Kapehu and Moanalulu 3100 Feet
2. Mauka boundary of Gen. Lease No. 926 to Manuel P. Silva, land of Laupahoehoe 5100 Feet

3. North and west boundaries of Lot 51, Hakalauiki,
Homesteads, leased by Mrs. R. de Lima1200 Feet

Total fence touching government lands9400 Feet

4. Across Hakalau-nui from Lot 51 to Hakalau Stream,
Hakalau Plantation Company1550 Feet

5. Across Umauma, Hakalau Plantation Company.....1450 Feet

Total fence across private lands3000 Feet

Fences are under construction across Lot 16, and on the mauka boundary of Lot 17, Opea-Peleau Homesteads by Tobias de Souza, tenant-at-will and owner, respectively, of these lots. The fence across the private lands of Honohina and Nanue is being built by the Hakalua Plantation Company.

The last two days of the month were spent reconnoitering a portion of the boundary of the new Waiakea Forest Reserve. This work has disclosed the advisability of including a considerable area of forest which covers a very rough old a-a flow makai of Section C of the Waiakea Homesteads. The new boundary was flagged and will be surveyed by Mr. Hockley early in December.

Respectfully Submitted,

CHAS. J. KRAEBEL,

Asst. Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, NOVEMBER, 1921.

December 28, 1921.

Superintendent of Forestry, Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir: I herewith submit a report of the work during the month of November.

NURSERY—DISTRIBUTION OF PLANTS.

The number of plants distributed, including those sent to forest reserves, are as follows:

Oahu:	Seed Boxes.	In Trans- plant Boxes.	Pot Grown.	Total
Sold .....	.....	....	260	260
Gratis	12,000	1100	3925	17,025
				<hr/> 17,285

SUB-NURSERIES.

	Seed Boxes.	In Trans- plant Boxes	Pot Grown	Total
Maui and Molokai.....	20,000	1,050	226	21,276
Kauai .....	.....	....	1,952	1,952
Hawaii	5,000	2,061	1,359	8,420-31,648
				<hr/>
Total for all Islands				48,933

COLLECTIONS—GOVERNMENT REALIZATIONS.

Sale of plants, Government Nursery, Honolulu	\$ 2.90
Rent of Office Nursery Grounds, October	35.00

Total\$ 37.90

PLANTATION COMPANIES AND OTHER CORPORATIONS.

Under this heading the distribution amounted to 1,400 pot grown trees.

MAKIKI STATION.

The work done at this station consisted of cutting up wood for boxes, mixing and sterilizing soil, potting and transplanting trees into boxes, etc.

HONOLULU WATERSHED.

The five men employed at the watershed were kept clearing off lantana and guava bushes, etc. at the bottom of Makiki Valley in preparation for planting.

ADVICE AND ASSISTANCE.

The writer made the following number of calls and otherwise gave assistance, at the request of people in and around the City.

Calls made	6
Advice given by telephone	4
Advice given people calling	8

ARBOR DAY (NOVEMBER 18, 1921).

The distribution of plants for Arbor Day at the Government Nursery, Honolulu amounted to 5,028, divided as follows:

General distribution of pot grown plants	2780
Schools, pot grown plants	462
1786 children called and received 1 tree each	1786

Total	5028
Distribution for Maui and Molokai amounted to	1356 1356

Total for Oahu and Maui 6384

The Arbor Day distribution for Hawaii and Kauai is included in general distribution.

Respectfully submitted,
DAVID HUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY.

REPORT OF ENTOMOLOGIST, NOVEMBER, 1921.

January 6, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T.H.

Gentlemen: During the month of November the insectary handled 11,500 pupae of the melon fly, from which there were bred 1,397 females and 1,549 males of the *Opius fletcheri*.

The distribution of the parasites was as follows:

MELON FRUIT PARASITES.
Opius fletcheri.

Oahu:	Females.	Males.
Moanalua Cucumber Field	300	300
Kalihi Cucumber Field	400	400
Kalakaua Ave. Cucumber Field	600	600

FRUIT FLY PARASITES.

Diachasma Tryoni.

Oahu:	Females.	Males.
Miss L. E. Perkins, 8th Ave., Kaimuki	50	50
Mr. M. Kawahara, Kalihi, Honolulu	150	150
Mr. H. Denison, Bingham St., Honolulu	50	50
Dr. W. F. James, U. S. Qt. Sta., Honolulu.....	300	300

Diachasma Fullawayi.

Oahu:	Females.	Males.
Miss L. E. Perkins, 8th Ave., Kaimuki	50	50
Mr. H. Denison, Bingham St., Honolulu	50	50
Dr. W. F. James, U. S. Qt. Sta., Honolulu	110	110

Opius Humilis

Oahu:	Females.	Males.
Dr. W. F. James, U. S. Qt. Sta., Honolulu	50	50

Dirhinus Giffardii.

Oahu:	Males and females.
Mr. M. Kawahara, Kalihi, Honolulu	400

Galesus Silvestrii.

Oahu:	Males and females.
Mr. M. Kawahara, Kalihi, Honolulu	600

Tetrastichus Giffardianus.

Oahu	Males and females.
Miss L. E. Perkins, 8th Ave., Kaimuki	400
Mr. M. Kawahara, Kalihi, Honolulu	700
Mr. H. Denison, Bingham St., Honolulu	300
Dr. W. F. James, U. S. Qt. Sta., Honolulu	1300

CORN LEAF HOPPER PARASITES.

Hawaii:	Males and females
Hon. H. L. Holstein, Kohala	1200

The colonies of the cabbage butterfly parasite and dung fly parasite, were maintained as usual and large numbers of a Staphylinid beetle (*Creophilus erythrocephala*) were reared and liberated also. Three consignments of hornfly enemies were received from Mr. Osborn and handled at the H. S. P. A. Experiment Quarantine room. Two lots were liberated on the Waialae Ranch, Oahu, one on the Parker Ranch, Hawaii. Considerable time was spent in investigating the insect problems of the pineapple industry and a paper on this subject was prepared and read at a conference of the plantation superintendents and foremen, on the 17th, 18th and 19th instants.

Respectfully submitted,

D. T. FULLAWAY,

Entomologist.

DIVISION OF PLANT INSPECTION.

REPORT OF THE CHIEF PLANT INSPECTOR, NOVEMBER, 1921.

November 30, 1921.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of November, 1921, as follows:

During the month 42 vessels arrived at the Port of Honolulu, 24 of which carried vegetable matter and 6 came by way of the Canal. The following disposal was made of the various shipments:

	Lots.	Pkgs.
Passed as free from pests	2,459	59,819
Fumigated	5	5
Burned	81	81
Returned	3	3
	<hr/>	<hr/>
Total Inspected	2,548	59,908

Of these shipments 59,437 packages arrived as freight, 319 as baggage and 152 as mail.

RICE AND BEAN SHIPMENTS.

18,519 bags of rice and 764 bags of beans from the U. S., and 4,146 bags of rice and 1,621 bags of beans from Japan arrived, all passed as free from pests.

PESTS INTERCEPTED.

Approximately 3,212 pieces of baggage belonging to immigrants from foreign countries were examined from which 35 lots of fruit and 30 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned fruits and vegetables follows:

Australia:

- Nov. 26. 1 pot plant, baggage, burned. Prohibited.
" 26. 1 pot plant, baggage, returned. Prohibited.

China:

- Nov. 20. 2 pkg. taro plants, baggage, burned. Prohibited.
" 24. 1 pkg. beans, baggage, burned. *Bruchus chinensis*.
" 24. 1 pkg. bamboo shoots, baggage, burned. Prohibited.
" 24. 2 pkg. paddy rice, baggage, burned. Prohibited.
" 24. 2 lots pomelo, baggage, burned. *Parlatoria zizyphus*.

India:

- Nov. 14. 6 cocoanuts, mail to Lyon, fumigated, dead scale on bracts.

Japan:

- Nov. 14. 1 pkg. beans, mail, fumigated. Precautionary.
" 20. 1 pkg bulbs, baggage, burned. Prohibited.

Philippines:

- " 24. 2 pkg. paddy rice, baggage, burned. Prohibited.

Porto Rico:

- Nov 10. 1 pkg. corn, baggage, burned. Prohibited.
 " 10. 4 lemons, baggage, burned. Prohibited.
 " 10. 1 pkg. seed, baggage, burned. Prohibited.

United States:

- Nov. 10. 1 pkg. sugar cane, cargo, burned. Prohibited.
 " 30. 1 pkg. plants, cargo, fumigated, *Aspidiotus rapax*, *Lepidosaphes ulmi*, *Coccus hesperidum*.

BENEFICIAL INSECTS.

- Nov. 1. 1 case beneficial insects, Dung beetles, from Osborn, Arizona, to Board of Agriculture and Forestry.
 " 8. 1 case beneficial insects, Dung beetles from Osborn, Arizona, to Board of Agriculture and Forestry.
 " 22. 1 case beneficial insects, Dung beetles, from Osborn, Arizona, to Board of Agriculture and Forestry.

All were handled at the H. S. P. A. in the same manner as past shipments.

HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 7 steamers with 6 carrying vegetable matter consisting of 220 lots and 4,098 parcels. 6,095 bags of rice and 154 bags of beans arrived from the mainland and were passed.

KAHULUI INSPECTION.

Mr. Louis Gillin, Inspector for Kahului, reports the arrival of 4 vessels, with all carrying vegetable matter. 14 lots and 2,446 parcels arrived and were passed. 2,825 bags of rice and 47 bags of beans arrived from the mainland, all clean.

INTER ISLAND INSPECTION.

46 vessels plying between Honolulu and other Island ports were attended and the following inspections made:

PASSED.		REJECTED.	
Taro	345 bags.	Plants	26 pkgs.
Vegetables	98 pkgs.	Fruit	3 pkgs.
Fruit	193 pkgs.		
Plants	96 pkgs.		29 pkgs.
Seeds	6 pkgs.		
Sugar Cane	10 cases		
	<hr/> 748 pkgs.		

LOCAL FUMIGATION.

During the month we fumigated for various local firms: 263 bags rice, 197 bags corn, 61 bags scratch food, 50 bags beans, 8 bags barley, 1 lot bamboo ware and 2 lots books.

Respectfully submitted,
 E. M. EHRHORN,
 Chief of Division.

DIVISION OF ANIMAL INDUSTRY.

REPORT OF TERRITORIAL VETERINARIAN, NOVEMBER, 1921.

Honolulu, Hawaii, December 20, 1921.

Board of Commissioners of Agriculture and Forestry,

Honolulu, H. T.

Gentlemen: I beg to submit herewith my report on the routine work of this Division for the month of November:

TUBERCULOSIS CONTROL.

During the month a total of 373 head of cattle were tested, out of which number 352 were passed as free from disease and 21 condemned and branded.

Besides the above testing post-mortem examinations were made on 13 head of cattle condemned on previous tests, lesions of tuberculosis being found in every instance.

HEMORRHAGIC SEPTICEMIA AND BOTULISM IN SWINE.

Considerable work has been done during the month in controlling outbreaks of hemorrhagic septicemia and botulism in swine occurring in widely scattered areas on this Island.

Early in these outbreaks, attention was directed to a peculiar condition not observed before. The animals responded slightly or not at all to various strains of hemorrhagic septicemia and mixed infection vaccines remained in a dormant and semi-comatose condition, refusing all feed in the advanced cases. Those just coming down with the disease showed difficulty in mastication and swallowing the feed, and in many cases exhibited a more or less complete paralysis of the hind quarters.

The administration of a polyvalent botulinus anti-toxin to the more advanced cases did little more than prolong the life of the animal, but in those exhibiting first symptoms a marked curative effect was noticed.

A few days ago a shipment of a special botulinus anti-toxin for this disease in swine was received and it is confidently expected that its use will check this affection in so far as biologics unaided by sanitation can do.

In going through these various piggeries treating the animals and inspecting the premises, a great lack of, and in many instances, an entire absence of anything resembling sanitation is forceably brought to the attention. The majority of hog raisers consider a hog able to live on any kind of food thrown to it, and under all kinds of filthy conditions. It is expected to live, thrive and reproduce on any kind of a ration, balanced or unbalanced, poor or rich, sweet or sour, and fermenting, housed in ramshackle buildings, in small enclosures which soon become mud holes, wallowing in filth for the most part, and sleeping on cold, damp concrete floors with no access to sun or light, in fact under conditions in which no other animal on the farm is expected to live and thrive.

When it is considered that the domesticated hog is physiologically an unnatural animal in that it is bred for a superabundance of flesh and fat and the smallest possible bone, it is easily seen that it is readily susceptible to infectious and contagious diseases and also to external and internal parasites.

There can be little doubt that a large percentage of the loss to which the hog industry has been subjected through outbreaks of infectious diseases in the past as well as at the present time is mainly due to lack of proper care, diet and sanitation, and such losses will continue to occur in spite of all possible treatment.

BOVINE HEMORRHAGIC SEPTICEMIA.

Two cases of this disease occurred during the past month. Ten head of in-contact animals were vaccinated and no further loss has been reported.

HAWAII.

Doctor Elliot reports as follows:

Port Inspections.

Steamship Enterprise, 6 horses; 6 sheep; and 12 crates of poultry.

Tuberculosis Control.

A total of 165 head of cattle were tested out of which number 158 were passed and 7 condemned and branded. Autopsies were held on 5 head of condemned cattle, all of which showed lesions of tuberculosis. No infectious diseases occurred in this district during the month.

Doctor Rowat reports as follows:

Tuberculosis Control.

During the month a total of 54 head of cattle were tested out of which number 51 were passed and 3 condemned and branded.

Reports on the outbreak of swine plague on the Parker Ranch are to the effect that no loss has occurred since vaccination.

A few cases of swine plague occurred during the early part of the month in Hawi. This outbreak was promptly checked with no loss outside of the original cases.

MAUI

Dr. Fitzgerald reports as follows:

Tuberculosis Control.

During the month 65 head of cattle were tested with no reactors.

The outbreaks of hemorrhagic septicemia occurred as reported last month are now well in hand and no further losses are expected.

KAUAI.

Dr. Golding reports that nothing of importance in the way of infectious diseases occurring during the past month. A few head of cattle were tested with no reactors.

Respectfully submitted,
LEONARD N. CASE,
Territorial Veterinarian.

**REPORT OF ASSISTANT TERRITORIAL VETERINARIAN,
NOVEMBER, 1921.**

December 19, 1921.

Dr. Leonard N. Case,
Territorial Veterinarian, Board of Agriculture and Forestry,
Honolulu, H. T.

Dear Sir: I beg to submit the following routine report for the month of November, 1921:

TUBERCULOSIS CONTROL.

During the month of November 373 head of cattle were given the tuberculin test and 21 head condemned and branded. Of the number tested 101 had just arrived from the Coast.

RABIES CONTROL.

Four dogs received at the Quarantine Station were given the anti-rabies treatment.

DISTEMPER TREATMENT.

Five young dogs received at Quarantine Station were treated with canine distemper prophylactic.

SWINE DISEASES.

Several outbreaks of disease among swine were investigated, post-mortem examinations made, treatment of sick pigs given and prophylactic biologics administered in seven different piggeries.

All piggeries in the Moiliili district were examined as to sanitation and health of pigs.

BOVINE HEMORRHAGIC SEPTICEMIA.

Two deaths occurred in a pasture in Palolo Valley from hemorrhagic septicemia.

Ten head of cattle in this pasture were given prophylactic treatment.

LIVE STOCK IMPORTATIONS.

Of the eighteen steamers inspected by me twelve brought the following live stock to this port:

12 dogs; 247 crates of poultry; 2 parrots; 13 crates of pheasants; 115 head of cattle.

Respectfully submitted,

L. E. CASE,

Assistant Territorial Veterinarian.



THE HAWAIIAN FORESTER AND AGRICULTURIST

FEBRUARY, 1922



CONTENTS

	Page
Editorial	29
Fire Wardens Appointed	30
Honolulu Watershed Protection	30
Forest Covers	45
Division of Forestry	47
Division of Entomology	52
Division of Plant Inspection	53
Division of Animal Industry	55

VOL. XXIX PRICE, TEN CENTS NO. 2

ARNOLD ARBORETUM
JAMAICA PLAIN,
MASS.



The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 207, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy; \$1.00 a year; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,

W. M. Giffard,

H. M. von Holt,

A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*

J. P. Pico, *Forest Ranger for Waiaesae-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Elele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss D. Ruttman, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XXIX.

HONOLULU, FEBRUARY, 1922.

NO. 2

This number is devoted mainly to the subject of the protection of the forest on watershed areas.

Examinations and surveys looking to the enlargement of several of the forest reserves on the Island of Hawaii continued during December.

The Territorial Veterinarian is looking forward to the early receipt of a new and successful vaccine which will immunize dogs against rabies with one treatment.

The Entomologist is working on methods of controlling the red spider, mealy bug, and scale which attack pineapple plants in these islands.

Over fifty Christmas trees of Japanese cedar and Arizona cypress were distributed during the latter part of December from the plantation near the Makiki Nursery established for this special purpose.

Trees to the number of 7,100 and consisting of thirteen species were planted out by the Division of Forestry on nine different forest reserves on three of the islands during December.

The Division of Forestry has adopted the lemon gum (*Eucalyptus citriodora*) as a marker for planting along forest reserve boundaries. This stately tree stands the wind well and its tall whitish trunk will distinguish the boundary line from afar.

The Territorial Veterinarian reports the completion of the tuberculin test for cattle for the year 1921 with reactors amounting to only 2.89 per cent and indications that the coming year will see a still further reduction in the number of animals found to be afflicted with this disease.

The first actual planting of the chaulmoogra oil producing plantation at Waiahole, Oahu, was begun in December, 1921, when 880 seedlings of *Hydnocarpus anthelminticus* were set out in the ground specially prepared to receive this much-prized tree.

The Superintendent of Forestry calls attention to the menace to forest and grazing lands of the wild goats which are increasing at such an alarming rate on Hawaii that assistance by the government in controlling them seems necessary.

FIRE WARDENS APPOINTED.

The following three appointments to the position of District Fire Warden were made by the Board of Agriculture and Forestry at a meeting held on February 3, 1922:

H. Blomfield Brown, in and for that portion of the District of Ewa, Oahu, lying to the west of Kamehameha Highway, to take the place of Wm. Weinrich, moved away.

Robert von Tempsky, in and for the District of Kula, Maui, to take the place of L. von Temksky.

William Campsie, in and for that portion of the District of Kau, Hawaii, extending from the land of Punaluu to the Kona District line, to take the place of George Gibb, moved away.

HONOLULU WATERSHED PROTECTION.

The following three letters of the Superintendent of Forestry bear on the subject of the protection of the watershed of the city of Honolulu at the head of Palolo and Manoa Valleys, within the Honolulu Watershed Forest Reserve and give the reasons why he recommended Rule V of the Division of Forestry which was adopted by the Board of Agriculture and Forestry on December 6, 1921, with a view to guarding the purity of the water and giving better protection to the delicate forest on the mountain by closing to the public an area of 1,480 acres of land owned entirely by the Territory.

Honolulu, Hawaii, January 23, 1922.

Hon. Wallace R. Farrington,
Governor of Hawaii,
Honolulu, H. T.

SIR:—In response to your recent request, I have the honor to present the following reasons which prompted the Board of Commissioners of Agriculture and Forestry, on December 6, 1921, to adopt Rule V of the Division of Forestry.

OBJECT OF RULE V.

This new rule, which is quite similar in form to Rule III applying to the Honolulu watershed in Nuuanu Valley, approved

by the Governor on March 31, 1916, is for the specific purpose of fostering the purity and continuance of a part of Honolulu's water supply, first, by preventing contamination of the water from human sources, and second, by assisting the forest in every way possible to maintain itself so that it will serve most effectively in conserving the runoff. The new rule will affect 1,480 acres of land, owned entirely by the government, at the head of Palolo and Manoa Valleys.

When promulgated, this rule will prohibit stock grazing on this area and will exclude from this particular portion of the Honolulu Watershed all persons excepting government officials and employees while in the discharge of their official duties.

HISTORY OF THE RULE.

Under the law, the Board of Agriculture and Forestry, is required (Sub-Sec. 7, Sec. 481, R. L. H., 1915), "to devise ways and means of protecting, extending, increasing and utilizing the forests and forest reserves, more particularly for protecting and developing the springs, streams and sources of water supply, so as to increase and make such water supply available for use."

One of the matters that was first mentioned to me when I began my term of responsibility in 1915, was that attention should be given to the protection of the forests on the Honolulu Watershed Forest Reserve. The first step in this direction was taken in March, 1916, when Rule III, prohibiting persons from entering the area draining into the Nuuanu reservoirs was, with the approval of the Board of Health, recommended, adopted by this Board, and approved by the Governor.

The areas to the southeast of Nuuanu at the head of Manoa and Palolo Valleys, were then studied and kept under observation in order to determine what steps, if any, should be taken for the benefit of the water supply and the protection of the forests on this area. In 1918, a careful survey was made of the forest along the trail from Pauoa Flats, across the headwaters of Manoa and Palolo Valleys, to Mt. Olympus and down Palolo Valley, when it was determined by actual count that 14 per cent of the landslides on this area were caused by the existence of the trail which had some years previously been cut through this region. The presence of Hilo grass along portions of this trail was also noted.

Repeated observations have been made since then to keep check on the spread of Hilo grass from this trail and to determine whether by any possible means I could be conscientiously persuaded that the continued use of this trail and the passing over adjacent lands by trampers could be allowed without detriment to the purity of the water supply originating on the area, or without injury to the native forest covering the steep moun-

tain slopes in this region. The results of my observations prohibited the formation of any such opinion.

This rule, therefore, was not inspired by hastily formed conclusions in an off-hand manner, but was recommended only after a careful study of the situation in the field, covering a period of years and was decided upon only after consultation with other foresters and after thoughtful deliberation of all circumstances justifying its promulgation, considering the greatest good for the greatest number of people. It was first presented to the Board on April 19, 1920, again recommended in June of the same year and in my report for the biennial period ended December 31, 1920, and was finally adopted at a Board meeting held on December 6, 1921. Copies of my letters of transmittal to the Board of April 9, 1920, and December 1, 1921, are herewith attached.

WATER SUPPLY.

Every drop of water originating on this area is needed and used, if not for city supply purposes, then for the raising of food stuffs such as taro and rice, and it is the duty of the government, as prescribed by the law quoted above, to maintain and increase the amount of this water. The water in Waiaiao section of Palolo Valley is used for supplying residents in the eastern section of the city. The banana and vegetable growers in upper Manoa Valley depend upon the streams for their domestic water independent of the city mains. Apart from the above uses of this water for potable purposes, the surface streams supply water for irrigating the taro, rice and other cultivated crops in both Palolo and Manoa Valleys and on the plains below these valleys.

The question of an adequate water supply for Honolulu is acute and is constantly before us. We read in our local journals almost daily articles on some phase of this question. If the water situation is serious now, what will it be a few decades hence when, if our aspirations mature, the city of Honolulu will have a much larger population and will need for its inhabitants every drop of water that falls on the mountain slopes of our city's watershed? We may neglect our obligation to the present generation, if we will, but it is our bounden duty to provide for future generations when the demands on the local water supply are going to increase rather than decrease.

FOREST PRESERVATION NECESSARY.

Unless steps for the improvement of the forest, such as that contemplated by this rule, are taken now, our fair city will suffer more acutely from periodic water-famine, eventually drought will be her permanent and chronic condition, and we will not be

able to accommodate our expected tourist crowds with this essential fluid, much less furnish it in sufficient and permanent quantities for the domestic needs of the resident population. The available supply of water is most certainly going to decrease unless necessary and radical steps are taken now to do everything possible to maintain and preserve the forest on the city watershed. Not only must the injury done to the forest in the past be repaired by artificial and natural means, but every step must be taken to head off and prevent further damage to the forest from whatever cause.

My predecessor, after 10 years' acquaintance with the native forest, was convinced that "to get the best results from the water bearing forests in Hawaii in the way of steady and continuous yields, it is in many localities essential that both animals and men be vigorously excluded.

INFLUENCE OF FOREST ON THE RUNOFF.

To everyone who has stopped to consider the benefits derived from a forest cover, it is plainly evident that the forest is one of the best means of preventing not only undesirable erosion but also of storing the water that falls from the skies. The force of the rain is broken by the trees, the underbrush, and the litter on the ground so that it does not beat directly upon the soil. Much of the precipitation reaches the earth by running down the twigs and branches. In a heavy rain the water drips down so quietly as to have practically no beating effect upon the soil and there is no perceptible surface runoff until large quantities of rain have fallen. The forest cover tends to convert the surface runoff into underground runoff or percolation, and the influence of a satisfactory forest cover in regulating the stream-flow is based on the principle that rain waters penetrate more readily a forest-covered soil than one that is bared of trees. The foliage, together with the loose litter of the forest floor, also reduces the compacting effects of the raindrops and the drying effect of sun and wind thus keeping the soil granular so that the water can easily percolate. The mechanical obstruction which the trunks, underbrush, litter, and ground cover offer to the rapid surface drainage of waters also lengthens the time during which this percolation may take place. The network, also, of deeply penetrating roots offers additional channels for a change of surface drainage into sub-drainage.

In all of these operations the condition of the forest cover has much to do with the degree of its effectiveness and the condition of the forest floor is of even more moment than that of the leaf canopy. The existence of a forest on our city watershed, therefore, enables a large part of the rainfall to percolate into the soil, there to be collected in the natural underground reservoirs and thence to be fed out gradually to the springs and

streams or pass on down into the artesian basins which are a very important source of Honolulu's city water supply. The well heads in these basins vary directly with the rainfall on the catchment areas above the wells, when these heads are not influenced by pumping. On account of the annually increasing demand for this water, however, this overdraft has lowered the artesian well heads in one basin from 42 feet in 1882 to 28 feet above sea level in 1915; hence, the importance of absolute forest protection on these watershed areas.

PURITY OF WATER SUPPLY.

The single fact that surface waters from the area under discussion are used for potable purposes should be sufficient for the promulgation of the rule. In the protection of the purity of its water supply, Honolulu is very much behind the times when compared with progress made on the mainland of the United States in matters of sanitation connected with the water supply of large cities.

Not only has the Board of Health of the Territory of Hawaii gone on record unanimously as approving the promulgation of Rule V and any other steps that the Division of Forestry may consider necessary in order to protect the water supply of Honolulu, but its sanitary engineer in a communication dated December 21, 1921, states as follows:

"An unprotected watershed is dangerous to public health. Wherever it is possible, the right of entry has been denied to all except those whose duties require their presence on the grounds.

"To permit a few trampers to roam at large over the watersheds of Honolulu is contrary to good practice and endangers the public health.

"The people of Honolulu went on record a few years ago as against the filtration of its surface water supplies. Such being the case, it is very important that the purity of the water on the watersheds be kept as great as possible.

"Statements have been made that in other countries people are allowed on the watersheds of the public water supplies. The parties making these statements fail to add that it is the rule to purify the water, before it is used, by means of storage, filtration, or chlorination.

"We are fortunate in Honolulu. Our watersheds are practically uninhabited and are not subject to continued pollution. Also the control of same is completely in the hands of the Territory.

"The future water supply for Honolulu is a matter of serious concern. The preservation of the forest on the Honolulu watershed is vital to the conservation of the water supply."

As an administrative measure, in connection with the operations of the City Water Works, the promulgation of Rule V

appears to be fully justified by the following statement quoted from a letter dated December 24, 1921, from the general manager:

"Your letter of the 23rd with enclosure, Rule V, pertaining to the protection of the watershed area at the head of Palolo and Manoa Valleys received, for which I thank you. In reply would say that I am heartily in accord with the stand you have taken and the means you have adopted to accomplish the end. This department has had considerable trouble in Palolo Valley; hundreds of trampers visiting this valley every month, and some have entered the tunnel, the men working there protesting, but to no avail."

On mainland city watersheds every possible precaution is taken to keep pathogenic bacteria out of the water and one of the rules most strictly enforced is the exclusion of humans from city watershed areas. The city of Portland, Oregon, for example, has the Bull Run Reserve set aside for this specific purpose. It embraces an area in the Cascade Mountains of 196 square miles and all persons, with the exception of forest rangers and water works employees while in the pursuit of their duties, are strictly prohibited from trespassing on the watershed. The Mazamas and other tramping organizations in the region are glad to *kokua* this rule. The city of Seattle with its Cedar River watershed and San Francisco with its Spring Valley watershed have similar prohibited areas.

SUSCEPTIBILITY OF HAWAIIAN FOREST.

The native forest, including the ground cover, on our own city watershed is of such a sensitive nature as to be far more susceptible to damage by human agency than are the coniferous and hardwood forests on the city watershed areas mentioned above. The latter consist of vigorous, deep rooted trees, which every autumn must harden themselves naturally for a more or less vigorous winter season. Such trees grow in more open stands and can exist independently of the dense ground cover of ferns and shrubs for the protection of their root systems which is so essential for the healthy existence of the delicate indigenous Hawaiian forest.

Only those who are keen observers who have spent long hours in our woods, and have studied our Hawaiian forests from the pathological and silvical viewpoint, fully realize that the indigenous forest in these islands is an extremely delicate and complicated affair which reacts promptly to any outside interference. One who was ably qualified to understand the station, Mr. A. Gartley, wrote me on March 21, 1919, as follows:

"I have noticed recently in the papers that there is considerable agitation by the Trail and Mountain Club to reopen the

trails which were opened some years ago for the benefit of tourists.

"You are very well aware, and even the layman here knows, that the opening of and use of these trails means the destruction of our forests.

"I understand that you have arranged a conference with Mr. Ford and the members of the Trail and Mountain Club and propose to restrict the opening of trails to a limited area of our mountain district. I believe that in making these restrictions it would be well for you to err on the side of prescribing a large area rather than a small one.

"We are all very much interested in conserving these forests, and a tremendous amount of damage can be done unless they are carefully guarded."

The wet native forest is composed of a society of plants living together in cooperative harmony and protecting each other. The upper story of light-demanding trees give shade to and protect the lower or second story of shade-enduring undergrowth, such as bushes, ferns, mosses, etc. The plants in the lower story could not exist but for the shade of the trees over them, and they in turn retain the moisture for and give food in the form of decomposed vegetable matter to the shallow-rooted systems of the trees under which they thrive.

Through long association these two main plant forms have accustomed themselves to each other and when one is disturbed the other will suffer. With the removal of the lower story or undergrowth, the absence of the protective cover for the roots of the trees induces changes in soil conditions, the roots dry out for lack of moisture and proper plant food, the trees are weakened, are exposed to the attacks of injurious insects and wood-destroying fungi, lose their vigor, and eventually die.

Any disturbing element which enters and begins to change these ideal conditions of plant association will upset the balance of nature in the native forest with disastrous results. When once this happens and is allowed to continue, the forest is doomed.

Foreign plants, which as a rule are faster growing than indigenous ones, when once introduced into the healthy Hawaiian forest are able to force back the native undergrowth and conquer the ground so completely that the trees suffer as described above and are not able to reseed themselves through the thick matted ground cover. These changes may continue until finally the once dark, wet forest composed of trees, vines, ferns, undergrowth and moss, a combination ideal for preventing excessive runoff and keeping the soil porous, will disappear and will be superseded by a barren open, useless waste, inoperative as to water conservation and often covered with introduced grasses and plants with perhaps here and there a few dead trees to testify to what once occupied the land in a useful capacity.

Whether this susceptibility is due to the fact that the forest is very ancient is a point for conjecture. That the Hawaiian forest is ancient is attested by recent scientific treatises. Rock in "A Monographic Study of the Hawaiian Species of the Tribe Lobelioideae, Family Campanulaceae (Bishop Museum, 1919), states that because of the numerous species of lobelia plants (149 species, varieties, and forms), their distribution over the whole group, and of a highly developed fauna dependent upon them, their age is enormous and that these facts indicate a very ancient occupation of this group of islands by their immigrant ancestors. This occupation has been so ancient, in fact, during the time that the allied genera and numerous species have been evolved that their immigrant ancestors cannot now be recognized. Beccari in "A Monographic Study of the Genus *Pritchardia*," (Bishop Museum, 1921), points out the antiquity of our native loulou palms, one of which is the same as that found in Cuba, and most of which are usually found as isolated trees in most inaccessible places such as steep cliffs exposed to terrific winds, or may be seen waving the crown of their leaves against the sky on the crests of the most inaccessible ridges.

The forest on the Palolo-Manoa Drainage Reservation covered by Rule V contains both these lobelias and *Pritchardia* palms which indicate without a doubt its great age.

The fact remains, that the balance of nature in the native forest on the Palolo-Manoa Drainage Reservation is tilting in the wrong direction, and it is not difficult to foresee what the outcome will be unless radical steps are taken now. Without this forest on this particular area the rain that falls will rush to the sea in a few days in roaring torrents of muddy water which will gouge out the valleys and side gulches. To replace the forest would be a herculean task involving all the resources of scientific knowledge and huge sums of government money.

The cheapest method in the end will be to do everything that can be done for the protection of the forest at the present time, to coax it along by every possible means, and gradually to replace it by the introduction of self-perpetuating and more vigorous forest components, a task covering a few centuries of time.

In the meantime, what we can and must do is to prevent the further introduction into this forest of any unfavorable factors and this is one of the purposes of this rule.

DAMAGE TO THE FOREST.

At the lower edge of the Honolulu Watershed Forest Reserve, far below this area, the makai limits of the native forest have been pushed mauka in places by cattle grazing which has resulted in the disappearance of the forest growth. In addition to this, Hilo grass has kept up a relentless attack with detriment to the forest undergrowth.

The area under discussion, however, is much farther back toward the summits of the mountain range, in the very heart of the watershed, and none of the forest deterioration there can be ascribed to grazing because so far as can be ascertained, there has never been any stock on the land. We, nevertheless, find that Hilo grass is spreading through this forest, killing out the undergrowth and trees and preventing reproduction. In the absence of grazing stock the cause for the presence of this grass must be ascribed to the human visitant, and this indeed is proven by the fact that the grass is most noticeable along the routes and cut trails used by trampers.

To be sure, the damage is done in all innocence, but the fact remains that so long as human beings traverse the area the seed of Hilo grass and of other foreign grasses and weeds will continue to be introduced into this region and the areas thus occupied by this detrimental grass will be continually extended.

The staghorn fern has also spread over portions of this area with detriment to the undergrowth and trees, forcing the ground cover back, smothering the smaller growths, and preventing natural reproduction by an almost impenetrable mass of armed fronds which fully occupies the ground. This particular fern is probably a native of New Zealand, since it is such an aggressive intruder, botanists inform me that it is probably not an indigenous plant, but was brought here by the early Hawaiian navigators. Chamisso found it here in 1818 but it probably began to thrive here not many centuries before then.

In this comparatively brief period, considering the antiquity of the native indigenous forest, the staghorn fern has spread over large areas with detriment to the forest growth, and it is certain that the introduced Hilo grass will make the same rapid strides that the staghorn is known to have made if its further introduction into the delicate forest is allowed to continue.

The immediate results of Hilo grass introduction are the choking out of the delicate ferns that cover the ground and the removal of the shady ground cover. This allows the soil to dry out and changes the moisture conditions for the shallow roots of the trees. With conditions thus disturbed the tree is weakened, and the forest is doomed. The process is familiar to all who tramp in the woods.

On the area in question, although Hilo grass can be found on almost every 100 feet of the cut trail from Palolo Crater over Mt. Olympus and across the headwaters of the Manoa rivulets below Konahuanui to the Nuuanu Ridge, the most noticeable damage caused by this grass invasion is in the region of Palolo Crater. Here there is a natural reservoir which is an important feeder to the streams which have been used in the past as a source of city water supply and to the springs which have recently been developed by the City Water Works, and

here, above all places, it is essential for an assured water supply that the forest be maintained in a perfect condition.

Let us consider what has happened here. A naturalist informs me that he visited Palolo Crater as far back as 1878 and that there certainly was no decadence of the forest at that time. "The Crater and its environs beyond were thickly covered with a healthy growth of trees and the ground cover was perfect." Dr. H. L. Lyon, Pathologist and Botanist of the H. S. P. A. Experiment Station, who has made careful observations of this region over a period covering the past 14 years, is of the opinion that the introduction of Hilo grass has been the cause of forest decline in this particular region. In "The Hawaiian Planters' Record" of December, 1919, page 300, he writes as follows:

"Probably no watersheds in these Islands are in a more critical condition than those on Oahu, and certainly no water supply is of more vital importance to this Territory than that derived from these watersheds.

"This Island has been more extensively and intensively exploited than any other in the group, and, carrying as it does the bulk of the Territory's population, its forests have been subject to more interference from man and animals than those of the other islands.

"Cattle have been the greatest factor in pushing the forests back to their present narrow limits, and at certain vital points cattle are still allowed to penetrate the remaining forests.

Where the cattle have been excluded the Hilo grass is keeping up a relentless attack, and little by little is pushing the forest line back towards the summits of the mountains.

"A very serious injury has been done to these forests by the promiscuous cutting of trails. These trails have formed avenues for the entrance of Hilo grass which, at many points well within the forest, has taken possession of considerable areas. This is very noticeable around the crater at the head of Palolo Valley. Ten years ago this trail ran beneath large trees and was bordered by masses of delicate ferns. Now the trees are dead and for the most part fallen over; the delicate ferns have disappeared and the ground is completely covered with Hilo grass."

At the very summit of the lesser Mt. Olympus peak where picnickers have been accustomed to stop for lunch during the past few years, and have brought in grass seed on their shoes, there is now, besides the blatant lunch papers, strings, orange peel and empty bottles, telltale of the untidy trumper, a patch of Hilo grass at least 12 feet square and not far off another patch still larger. There can be no question but that this grass has grown from seed brought up from the lower levels on the boots of trampers. It is not claimed that this grass carrying is done intentionally or maliciously; it is done all unconsciously by the innocent trumper who does not realize that the thousands of little white specks which cling to his boots are the seeds of a pernicious weed. It is impossible for anyone to go through

Hilo grass without collecting some of its seed upon his boots or clothing, and it is therefore inevitable that as long as trappers continue to circulate in this region the dispersal of Hilo grass will continue. The absence of malicious motive on the part of the trapper does not justify him in doing a thing which may result in a far-reaching detriment to his entire community. Unless this invasion is checked very soon, the grass will spread through the susceptible surrounding forest and we will have serious trouble (forest denudation) then at the very core of the watershed where forest protection demands most emphatically that the native ground cover be kept absolutely intact and in a healthy condition.

Hilo grass is now so widespread all along the trail through this area and in the zone spreading out from it that it will be a huge task to eliminate it entirely. This will have to be done, however, if the forest is to be saved. Experimentation will have to be resorted to until the task is accomplished. Crude oil is said to be effective in killing Hilo grass but for the most part the grass must be dug out and kept out by shade thrown from plants, such as ginger, set out in the infested area. This work will go for naught if there is to be continued interference by general tramping on the area and by new introductions of Hilo grass seed.

No one will deny the importance of this forest on this area, that it is sorely needed for the conservation of water, and that it should be protected in the best possible manner. The promulgation of Rule V is, aside from sanitary reasons, the necessary first step in this direction.

AREA INCLUDED IN RULE.

It is to be regretted that a few people will by this rule be deprived of the personal pleasure of visiting some of their favorite haunts but it is only reasonable to ask of them this self-sacrifice and for them generously to accept the facts for the good of the community as a whole. It is only reasonable to ask of them, as citizens, to serve the city in this manner for the benefit of the water supply which in the very near future will have to be greatly augmented to meet increased demands.

The area to be closed amounts to only 1,480 acres of land owned entirely by the Territory. This, added to the prohibited area in Nuuanu Valley gives a total of 3,390 acres closed to trappers on Oahu. This entire area is only 5 per cent. of the total area included in forest reserves on this island and is less than .9 per cent. of the total land area of Oahu. Surely, enough diversity for routing hikes can be found elsewhere without penetrating our delicate Honolulu watershed and endangering the purity and continuance of the city's water supply.

DAMAGE DONE BY TRAMPERS.

Although the chief damage, which this rule seeks to terminate, is the spread of Hilo grass through the forest, a phenomenon which works the most insidious and the most extensively, it is desired also to obviate the direct damage which trampers do in this region, unintentional to be sure, but none the less real. The following quotations from an article by Mr. T. P. Cadle published in the "Honolulu Star-Bulletin" of December 17, 1921, describe most admirably the ruthless manner in which some of this damage is done and the evidences of destruction following in the wake of a group of hikers on and near this very same watershed.

"The party then turned to the left and ascended a precarious ridge which continuously gave way, and showers of rocks and trees and small bushes fell to the great depths below."

"Th ascent was made up Palolo valley and Palolo falls. **** A little brook runs down this valley carrying water throughout the year. Even in the driest times the slopes on either side are green with luxuriant vegetation. Banana trees and ti plants grow in profusion along the way. The ascent was made directly over the falls, sometimes in the water and sometimes a little to one side. A short visit was paid to the new Palolo tunnel, which, by the way, does not appear to be furnishing as much water as it did a year ago."

"Dark, thick clouds are ever the bane of the mountain climber, for they confuse the direction, and by depositing moisture, even though no rain falls, cause the trail to become slippery and landslides easy to form."

"In spite of the fact that over a year had elapsed since the former descent was made, no difficulty was experienced in finding where the other party had gone down.****Vegetation that has given away under the foot, little broken twigs, bent grass and bushes all indicate that some one has been over the trail before; ****"

"The soil which covers the hard rocks is not over an inch or two in depth and so precarious is its hold that excessive rains or falling rocks start landslides that do not stop until they reach the bottom.****A person must at most times sit on the ground and gradually work himself down, and if he feels himself falling to throw himself full length upon the ground with arms outstretched in order to get the advantage of every obstruction. This was the method pursued by the group making the descent."

"A few lehua trees manage from point to point to maintain a precarious hold in the rock. These give some support, but too much reliance cannot be placed upon them."

"These were subjected for half an hour to a continual rain of small stones and large rocks that were loosened by those above. It was about as safe as in a battlefield to stand there

with the rocks hurtling about you, some crashing to the valley below and some breaking through the trees over your head."

For the purpose of guarding the purity and continuance of the water supply and for preventing further damage, as described above, to the forest growth which it is essential to maintain in a primitive condition if the water supply is to be increased and made available for use, the Board of Commissioners of Agriculture and Forestry has adopted Rule V and recommends its promulgation.

Very respectfully,

C. S. JUDD,

Executive Officer and Superintendent of Forestry.

(PROPOSED RULE V)

Honolulu, Hawaii, April 19, 1920.

Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen: Attention has for some time and particularly of late been centered on the undesirable introduction of Hilo grass into our native forest by the seed being carried on the shoes and trousers of pedestrians and dropped along existing trails where it germinates and soon spreads to the detriment of the indigenous ground cover. Instances of this, such as the trail from the Waiahole tunnel over the top of the Koolau Mountain range to Waiawa Valley have been cited and particular attention has been called to the spread of Hilo grass along the trail at the Palolo crater within the Honolulu Watershed Forest Reserve.

The damage done to the native forest by the spread of Hilo grass, the ease with which one detrimental factor may upset the balance of nature and cause the native forest to deteriorate, and the function of the forest on the steeper slopes of our mountains back of Honolulu in conserving the sources of water supply have been set forth in detail several times and do not need repetition here.

With the city and Territory devising ways and means of enlarging the water supply of Honolulu, a problem which is becoming increasingly important, it seems only proper that this Board should participate in the solution of the problem by giving the forests on the city's watershed the best possible protection and freedom from deteriorating influences.

Nuuanu Valley receives this protection by Rule III of this Division approved on March 31, 1916, and I deem it my duty in compliance with paragraph 7 of Sec. 481, R. L. H. 1915 to recommend the adoption of the attached proposed Rule V of this Division.

The law quoted above reads as follows:

"It shall be the duty of the board:

"7. PROTECTION OF FORESTS AND WATER SUPPLY. To devise ways and means of protecting, extending, increasing and utilizing the forests and forest reserves, more particularly for protecting and developing the springs, streams and sources of water supply, so far as to increase and make such water available for use;"

This rule contemplates the prohibition of trespass on the higher mountain slopes back of Palolo and Manoa Valleys where the watersheds of these two drainage systems originate.

Premiscuous tramping on this area has already caused forest deterioration in places and I would consider myself derelict in my duties, did I not recommend the adoption of this new rule and make every effort to prevent further deterioration.

By protecting this forest now, the most difficult and well nigh impossible task of replacing it later on will be obviated and untold thousands of dollars will be saved.

The proposed rule has been given publicity in order that it may be thoroughly appreciated and understood before it goes into effect. The only objection to the rule has been voiced by the Hawaiian Trail and Mountain Club which desires to keep open the Konahuanui-Mt. Olympus trail. To allow this, would in my mind defeat the purpose of this rule. The said Club has requested to be heard on the subject and if this rule meets with your approval, I suggest that before final adoption a public hearing be held by this Board to consider arguments for or against its adoption.

Respectfully submitted,
C. S. JUDD,
Superintendent of Forestry.

(PROPOSED RULE V)

Honolulu, Hawaii, December 1, 1921.

Board of Commissioners of Agriculture and Forestry,
Honolulu, H. T.

Gentlemen: The indigenous forest on the higher mountain slopes in the Honolulu Watershed Forest Reserve, Oahu, at the head of Palolo and Manoa Valleys from the Waialae-nui ridge to Nuuanu ridge is in a declining condition and from the viewpoint of forest pathology is "going back." There is no stock grazing or roaming about on this area and the cause for this decline cannot be assigned to the depredations of grazing animals.

The great importance of the forest cover on these two watershed areas and the cost of replacing it with a satisfactory substitute, should it unfortunately become necessary, have already been described and need not be repeated here.

Whether the forest is declining from changes in soil or drainage conditions, as did the Koolau forests on Maui, from undue exposure to excessive winds, or from lack of usual rainfall, the fact remains that more trees are dying each year than formerly, the staghorn fern is covering up larger areas and preventing a new growth of forest trees by natural reproduction, and the Hilo grass which is spreading from the main trail along the mountain range is each year reaching further into this opened forest and providing the same undesirable check to natural tree reproduction.

The cutting of this trail along the mountain summit was an acknowledged mistake for it not only was the cause of some of the destructive landslides on these steep mountain slopes but it is now acting as the focus for the spread, in a zone paralleling the trail, of Hilo grass which in seed form has unwittingly been brought in on the feet of trampers.

The continuous use of this trail and the consequent further importation of Hilo grass seed on to the area interferes with every plan for correcting this undesirable condition which is becoming worse each year.

For the best good of this delicate forest and in the effort to take initial steps toward the eradication of the Hilo grass by shading it out with new growth and otherwise, I proposed the prohibition of tramping on this area by laying before you on April 19, 1920, with the recommendation that it be adopted, Rule V, a copy of which is herewith again presented.

At the regular Board meeting of May 4, 1920, it was voted to defer action on this proposed rule until after a public hearing for its discussion. This hearing was duly advertised and held on June 9, 1920. At this time the Hawaiian Trail and Mountain Club protested the proposed closing of the Olympus-Konahuanui trail on the ground that it was a tourist asset.

The adoption of Rule V was again recommended in my published report for the biennial period ended December 31, 1920.

On April 28, 1921, at the invitation of the Hawaiian Trail and Mountain Club, I delivered a paper, "Hawaiian Forests and Trails" before that body. This was published in the April 1921, "The Hawaiian Forester and Agriculturist" and in the "Honolulu Star-Bulletin" of April 30, 1921. At the conclusion of the delivery of the paper, the foregoing club voted unanimously to plan its excursions so as to interfere as little as possible with forest protection.

In my routine report for the month of April, 1921, I again called your attention to my recommendations concerning this rule which were still before you but no action was taken.

I respectfully call your attention once again to my recommendations and this rule and recommend that final action be taken either to adopt or reject it so that my responsibility, as to any advantages or disadvantages which may accrue from the adoption of Rule V, may be determined.

Yours very truly,

C. S. JUDD,
Executive Officer.

FOREST COVERS.

The following interesting letter has been received from Mr. G. C. Munro of Lanai and deals in an instructive manner with his observations on suitable ground covers for denuded and bare eroding ridges such as are found on Lanai and Molokai.

Answers to Mr. Munro's questions on the origin in Hawaii of the Norfolk Island pines and the kauri pine will be gratefully received. We have suspected that the kauri pines in Honolulu are of Queensland rather than of New Zealand origin.

C. S. J.

Keomuku, Lanai, T. H., February 20, 1922.

To the Editor, Hawaiian Forester and Agriculturist,
Honolulu, T. H.

Sir: Referring to Mr. C. S. Judd's note on my letter of June 28th, 1921, and published in the September, 1921 Forester, and to Mr. Judd's explanation to Governor Farrington as to reasons for closing certain forest areas to the public, I would say that so far as the water supplying forests for the City of Honolulu are concerned, his arguments for the exclusion of human beings are in the main sound, but nature has provided other means by which grasses will invade these areas if a suitable ground surface presents itself.

My experience has been principally with forests injured by livestock, and in all cases where the stock have been removed the ground cover has made a wonderful recovery, and the introduced grasses, where the denuded areas were not large, have been covered up by the native growth.

On the main ridges of the Lanai forest region, the highest point of which is 3,400' elevation, trails are kept open and continually traversed by horsemen and pack mules, and much seed of foreign grasses germinate along these trails, but the grass cannot spread into adjacent forest, even molasses grass, (*Melinis minuteflora*) which will overgrow and smother *Paspalum dilitatum*, does not seem to make headway against *Sadleria* "Amamau," and staghorn "Uluhi" ferns; observations of this grass are not yet conclusive but I believe that it would be a most useful plant for the bare eroding ridges and land slides where the native plants take slowly, at about 2,000' elevation as it

flourishes on such places and forms a mass of vegetation open at the top to receive rainfall and thick below to hold it, and a grass cover is certainly better than a bare surface for water conservation.

Examination of many miles of country at Rotorua, New Zealand, devastated and covered deep with mud by a volcanic eruption in 1886, and a small area mud covered in 1917, show conclusively that grasses first take up the desert country there and prepare the land for the forest that follows, in this instance the native "toitoi" was the principal plant to come in first after the eruption.

I disagree entirely with Mr. Judd in his condemnation of the staghorn fern, two of these, *Gleichenia linearis* and *Gleichenia longissima*, in conjunction with *Sadleria* ferns and leie vine are amongst our best forest covers on Lanai, if there is any advantage in competition it is on the side of the *Sadleria* and leie, the staghorn dies periodically in patches and trees and ferns come up in the humus and in turn crowd the staghorn, *G. linearis* and *Scaevola cylindrocarpa* make a complete balance in harmonious competition, at one time the staghorn being in evidence and another the *Scaevola*, the one in turn completely covering the other, but each holding its own, and meanwhile building up a mass of humus on the ground surface below.

During the seventeen years the writer has been in charge in turn of the Molokai ranch and the Lanai forests, in conjunction with others interested, and the various foresters that have served the Territory, a continual search has been kept up for a suitable tree for exposed ridges where the native trees remain stunted, none seemed to fill the place until in 1919 the Norfolk Island pine was tried and it gives great promise even amongst staghorn fern and thick tree growth, the more dense the cover over it the greener it appears, though not a fast grower it is remarkably wind resistant and should be effective in time. The idea was taken from an old tree about 75' high and 3' in diameter five feet from the ground, growing at an elevation of 1,800'; this tree precipitates moisture in a shower during a fog when surrounding trees condense none to speak of.

Has anyone got data on when these few very large Norfolk Island pines were brought to the Territory? And whether the New Zealand kauri pines were brought at the same time? As it seems to me probable that this kauri pine is an allied species to the New Zealand tree from Norfolk Island, where a fossil gum is obtained similar to New Zealand kauri gum, with 20 years experience with the New Zealand kauri pine I cannot reconcile the trees at the nursery in Honolulu and at Ulupalakua with the New Zealand species, and if the same it is a remarkable instance of change under different environment.

With apologies for asking for more space than is due me.

Yours truly,

G. C. MUNRO.

DIVISION OF FORESTRY.

REPORT OF THE SUPERINTENDENT OF FORESTRY, DECEMBER, 1921.

Honolulu, Hawaii, January 26, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of December, 1921:

TREE PLANTING.

The past month witnessed greater tree planting activities than in any previous month for many years and this work was materially assisted by favorable moisture conditions. Trees of various species amounting to a total of 7,100 were planted out on nine different forest reserves on three islands as follows:

Oahu:

Lualualei Reserve at Mikilua—logwood	1,958	trees.
Makua-Keaau Reserve at Keaau—Norfolk Isl. pine	25	" "
Makua-Keaau Reserve at Keaau—Ironwood	150	" "
Pupukea Reserve, Aiea—Lemon gum	152	" "
Waiahole Reserve—Koa	480	" "
Waiahole Reserve—Lemon gum	300	" "
Waiahole Reserve—Chaulmoogra	880	" "
Hon. Watershed Reserve, Tantalus—Koa	37	" "

Kauai:

Papapahalahola, Spring Reserve—Koa	4	" "
Lihue-Koloa Reserve, Kalaheo—Silk oak	570	" "
Lihue-Koloa Reserve, Kalaheo—Swamp mahogany	1,278	" "

Hawaii:

Hilo Forest Reserve, Honouliuli—Moreton Bay fig	1,000	" "
Hilo Forest Reserve, Hakalau—Lemon gum	207	" "
Olaa Forest Park Reserve, Sec. C.— <i>Taraktogenos Kurzii</i> ..	35	" "
Olaa Forest Park Reserve, Sec. C.— <i>Hydnocarpus castanea</i> ..	4	" "
Olaa Forest Park Reserve, Sec. C.—Hawaiian bamboo...	20	" "

Total ..	7,100	"
----------	-------	---

The lemon gums were all planted along forest reserve boundaries so that in due time the white trunks of these trees will distinguish the location of the boundary from afar.

The planting of the chaulmoogra oil producing plantation at Waiahole actually began during the month with the setting out on plowed and harrowed land of 880 seedling of *Hydnocarpus anthelminticus*. A small tool and shelter house was constructed on the planting area. As an experiment to test their adaptability to the region, a few *Hydnocarpus castanea* and *Taraktogenos Kurzii* seedlings, propagated at the Hilo Nursery, were also planted out by Ranger Mackenzie on forest reserve fenced land at 18 Miles on the Volcano Road in Olaa, Hawaii.

On the last day of the month 12 boy scouts from Troop 4 under my personal instruction began the planting of koa trees on Tantalus under the arrangement mentioned in my report for November.

The lodgepole pine seeds secured from Colorado are germinating well in the Honolulu, Maui and Hawaii nurseries and as soon as the young seedlings are large enough they will be distributed for planting in various situations.

Reply postal cards were sent out to all tree planters for the purpose of securing statistics on the number of species of trees planted during 1921.

FENCING.

During the month a new fence .61 mile in length was constructed in cooperation with the Puu Oo Ranch on a part of the new boundary of the Hilo Forest Reserve on the line between the government land of Piha and the private land of Honohina.

Fencing under construction and arrangements for additional fencing on the boundaries of this same reserve at Waikaumalo and Kaiwiki progressed during the month but details as to the actual amount of fencing completed during the month have not yet been received from Ranger Peralto.

Ranger Mackenzie reports that all the fences on the boundaries of Section C of the Olaa Forest Park Reserve, Hawaii, are now in good shape with the exception of a stretch of 800 feet at 22 Miles on the Volcano Road for the repair of which posts are now being cut.

HILO FOREST RESERVE.

Mr. Hockley finished the field work in connection with the resurvey of the Hilo Forest Reserve boundary and the new Waiakea Forest Reserve and is now working on the maps and descriptions. On December 16, while on Hawaii, I inspected and approved the boundary line of the latter reserve where it skirts the edge of the heavy woods south of the Waiakea homesteads.

KEAUOHANA FOREST RESERVE.

On the same day the boundaries of the Keauohana Reserve were pointed out to my assistant and to Ranger Mackenzie and the latter was instructed to mark the corners with the standard pipe monuments. The forest, which consists of ohia and kopiko trees and ie-ie vines and is on the road to Kalapana, is in excellent condition and does not appear to be in need at present of protection by fencing.

ADDITION TO UPPER WAIAKEA FOREST RESERVE.

From December 9 to 13, I inspected the mauka end of the land of Waiakea to determine what portions of it should be included in the contemplated addition to the present upper Waiakea Forest Reserve. Starting out from the Volcano House with my assistant we passed along the mauka boundary of this land which coincides approximately with the trail to the Puu Oo Ranch, a distance of 35 miles. Most of the 15,000 acres under consideration is well forested except for recent lava flows and only two kipukas are suitable and workable as grazing propositions. These will be left out of the description which the Territorial Surveyor has been requested to furnish.

Wild goats by the hundreds were observed in this upper country and, in my opinion, they will soon overrun the land in such numbers that it will be necessary for the Territory to assist in controlling them by employing professional hunters.

With the kind assistance of Dr. Shutte of the Puu Oo Ranch and his cowboys, three main triangulation stations—Mawae, Kahiliku and Kipu, were located and substantially flagged in anticipation of their use in the near future by the surveyor.

On our return one day was spent in a botanical study of the trees in Kipuka Puaulu in the Kilauea Section of the Hawaii National Park.

MAUI TRIP.

On December 24, I sent my assistant to Maui to check up on the fence building on a portion of the Kula Forest Reserve boundary required by License for Right of Way No. 1363 issued on August 24, 1921, by the Land Commissioner, to J. H. Raymond, C. D. Lufkin and D. H. Case. This license required that a substantial American fence be constructed on 2.60 miles of forest boundary in the region of Polipoli Spring to be completed by December 23, 1921. My assistant found that not one post hole even had been dug in connection with the project and the Land Commissioner has been so notified with the suggestion that if he does not cancel the license he require this fence to be built at the earliest possible date.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY, DECEMBER, 1921.

January 13, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: I respectfully submit the following statement of my activities

The first 19 days of December were spent on the island of Hawaii. The during the month of December, 1921:

work of looking out the uncompleted portion of the new Waiakea Forest Reserve boundary was finished on December 1 and the new line was surveyed on the following day by Mr. Hockley. Two days were spent reconnoitering the eastern edge of the forest in the vicinity of the Puna Forest Reserve, in company with Mr. Herbert Shipman, lessee of the contiguous government grazing land of Kaohe. The purpose of this trip was to consider altering the east boundary of this reserve to conform more nearly with the actual forest edge, which is the natural limit of grazing land and upon which the fence required of the lessee should rightly be built. It became evident from this inspection that a considerable area of forest land would be added to the Puna Reserve by such a revision of the east boundary, and it is therefore recommended that a survey be made as soon as possible to facilitate the change. Mr. Shipman is justified in delaying construction of the fence until final adjustment of the boundary is made.

On December 6, the final surveyor's description of the makai boundary of the Hilo Forest Reserve was completed by Mr. Hockley. While this work was in progress I prepared a statement of the condition of fences along this boundary, showing the amount of fencing now existing, the fencing now under construction and the amount still required to assure the complete protection of the reserve.

On December 9, Mr. Judd arrived in Hilo. Together we spent five days on a trip to the Puu Oo Ranch for the purpose of determining the mauka boundary of the upper Waiakae Forest Reserve. In this region a considerable area of true forest land which is useless for grazing should be included in the forest reserve. Several triangulation stations were found and flagged in order to facilitate the survey which will be made early in the Spring to readjust this boundary line. Under the guidance of Ioane, an old native of the region, the "lost" station known as Kipu was also found and flagged. During this trip many goats were seen along the boundary and 14 were killed.

KIPUKA PUAAULU.

Upon our return from Puu Oo, two days were spent in the vicinity of the Volcano, studying and photographing the trees in the Kipuka Puauulu (Bird Forest). This attractive spot, now included in the Kilauea National Park, will require peculiar attention in the future to maintain the area in its present state of beauty. The gently rolling topography, the widely spaced trees, standing singly or in groves of various size and density, are all accentuated by the fact that the forest floor has been kept free of undergrowth and the grass cover kept closely cropped by grazing stock. The chief charm of the whole park lies in this clean grassy floor and in the deep vistas made by irregular tree groups. Every part of the area has been kept pleasantly open and accessible to foot travelers chiefly by the light grazing of horses. If the Kipuka is put under absolute protection from grazing, the grass will become rank, shrubs and trees will spring up, and within a very few years the area will lose its open park-like aspect and will revert to the condition of a dense native forest. It is therefore advisable to make observations in the area from time to time to determine whether regulated grazing of horses should be recommended in order to maintain the area in its present condition of beauty and accessibility.

On December 16 a trip was made with Mr. Judd and Ranger Mackenzie to examine the small Keaunohana Forest Reserve in Puna. At the same time plans were made for planting several of the small reserve areas along the Volcano road with pure stands of *Cryptomeria* and other trees. Some time was also spent examining a portion of the new Waiakea Forest Reserve.

On December 17, with Mr. Judd and Ranger Peralto, I went to Ninole to discuss with Mr. John Vieira the matter of fencing the forest boundary along the upper Maulua homesteads which are controlled by Vieira.

MAUI TRIP.

I returned to Honolulu on December 20 and left on December 24 for Maui, where the remainder of the month was spent.

An inspection at Haiku Nursery revealed that the driveway from the main road to the nursery gate is in bad condition and in need of repair. Because of the heavy winter rains, which are common at Haiku, it is advisable to make a permanent improvement of this road, and to this end a plan is submitted in a separate memorandum.

On a trip to the Polipoli section of the Kula Forest Reserve it was found that the fence, required by License for Right-of-Way No. 1363 to be built by the Raymond Ranch, had not been built. A report on this matter is submitted in my letter of January 9, 1922.

Respectfully submitted,

CHAS. J. KRAEBEL,

Assist. Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, DECEMBER, 1921.

January 19, 1922.

Superintendent of Forestry, Board of Agriculture and Forestry,
Honolulu, H. T.

Dear Sir: I herewith submit a report of the work during the month of December, 1921.

NURSERY DISTRIBUTION OF PLANTS.

The number of plants distributed, including those sent to forest reserves, are as follows:

Oahu:

	Seed boxes.	In transplant boxes.	Pot grown.	Total
Sold	....	150	66	216
Gratis	1,700	500	2,253	4,453

 4,669

SUB-NURSERIES.

	Seed boxes.	In transplant boxes.	Pot grown.	Total
Maui and Molokai:	....	4,482	777	5,259
Kauai:	4,000	....	87	4,087
Hawaii:	....	4,464	91	4,555

 13,901

 Total for all Islands18,570

PLANTING IN FOREST RESERVES.

Oahu:

Lualualei Reserve—Logwood	.....	1,958
Pupukea Reserve—Lemon Gum	.....	152
Tantalus Reserve—Koa	.....	37
Waiahole Reserve—Koa	.....	480
Waiahole Reserve—Lemon Gum	.....	300
Waiahole Reserve—Hydnocarpus Anthelminticus	.....	880

Kauai:

Kalaheo Reserve—Swamp Mahogany	.....	1,278
Kalaheo Reserve—Silk Oak	.....	570

 Total5,655

COLLECTIONS—GOVERNMENT REALIZATIONS.

Sale of Plants, Government Nursery, Honolulu	.....	\$ 2.50
Rent of Office, Nursery Grounds, November	.....	35.00
Sale of Plants, Hilo Nursery	.....	6.90

 Total\$44.40

PRESERVATION OF FOREST RESERVES.

Black Sand:

133 loads of black sand were taken from Makiki Sand Pit.....\$66.50

Rents:

Rent of premises at Halfway House, Tantalus, for quarter ending December 31, 1921	.....	30.00
Fee for use of land and gathering ti leaves in Pauoa Valley at \$50.00 per year, July 1st to June 30	.....	25.00
Rent of 73 acres of land to Parker Ranch in Hilo Forest Reserve near Keanokolu at \$39.50 per year from August 12, 1920 to August 12, 1922 (two years)	.....	79.00

 Total\$134.00

Kokee Camps:

Fee for site No. 50, Kokee Camps November 1, 1921 to December 31, 1922	\$ 5.36
--	-------	---------

ANIMAL DIVISION REVOLVING FUND.

Received from sixteen people and organizations the sum of \$548.60 for vaccine, the same being deposited as a special fund, with the Treasurer, December 31, 1921.

MAKIKI STATION.

The work done at this station has been principally routine. We have a good supply of lumber on hand for seed and transplant boxes, also for fencing material. The *Grevillea robusta* trees which were cut down on the Judiciary grounds on Queen Street in preparation for street widening, were turned over to us by the Superintendent of Public Works, consequently we have a stock of good lumber on hand seasoning.

HONOLULU WATERSHED.

The men employed on the watershed have been hoeing and clearing away brush and vines from the young trees also keeping in check the pest "*Caesalpinia bonduc*" which is again attempting to spring up, also clearing trails.

About seven years ago a plot containing between two and three acres was planted, in Hering Valley, with trees to be used for Christmas trees. From this plot over 50 trees were cut and delivered to kindergartens, schools, churches, and charitable institutions, for Christmas celebrations..

ADVICE AND ASSISTANCE.

The writer has been called upon to make visits and otherwise give advice and assistance in planting and pruning trees, etc. A few requests are also on file by the Commanders of the different military posts to pay visits and assist them in planting etc.

Visits made	6
Advice given at Nursery	8
Advice by telephone	7

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY.

REPORT OF ENTOMOLOGIST, DECEMBER, 1921.

January 11, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: During the month of December the insectary handled 9,300 pupae of the melon fly, from which there were bred 2,127 females and 1,762 males of *Opius fletcheri*.

The distribution of parasites was as follows:

MELON FRUIT PARASITES.

Oahu:	<i>Opius fletcheri</i> .	LLLL	
		Females.	Males.
Cucumber Field, Sheridan St. Honolulu	450	400	
Cucumber Field, Kalakaua Ave., Honolulu	650	650	
Cucumber Field, Kahili, Honolulu,	450	450	

FRUIT FLY PARASITES.

Diachasma Tryoni.

Oahu:	Females.	Males.
Mr. M. Kawahara, Kalihi, Honolulu.....	160	160

Diachasma Fullawayi.

Oahu:	Females.	Males.
Mr. M. Kawahara, Kalihi, Honolulu.....	180	140

Dirhinus Giffardii.

Oahu:	Males and Females.
Mr. M. Kawahara, Kalihi, Honolulu.....	450

Galesus Silvestrii.

Oahu:	Males and Females.
Mr. M. Kawahara, Kalihi, Honolulu.....	800

Tetrastichus Giffardianus.

Oahu:	Males and Females.
Mr. M. Kawahara, Kalihi, Honolulu.....	1,500

The colonies of the cabbage butterfly parasite, dung fly parasite and corn leaf hopper parasite were maintained as usual and the new Staphylinid beetle reared and liberated in numbers as in previous months.

Only one consignment of hornfly enemies was received from Mr. Osborn during December which were liberated at the Waialae Ranch, Oahu. A number of experiments were started at Moanalua to determine the best method of controlling the red spider, mealybug and scale attacking the pineapple plant.

Respectfully submitted,
D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION.

REPORT OF THE CHIEF PLANT INSPECTOR, DECEMBER, 1921.

Honolulu, December 31, 1921.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of December, 1921, as follows:

During the month 52 vessels arrived at the port of Honolulu, 29 of which carried vegetable matter and 9 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	2,141 lots.	28,145 packages.
Fumigated	29 "	29 "
Burned	105 "	105 "
Returned	10 "	10 "

Total Inspected.....2,285 lots. 28,289 packages.

Of these shipments 27,678 packages arrived as freight, 452 as baggage and 159 as mail.

RICE AND BEAN SHIPMENTS.

15,500 bags of rice and 1,088 bags of beans from the U. S., and 4,313 bags of rice and 3,470 bags of beans from Japan arrived, all passed as free from pests.

PESTS INTERCEPTED.

Approximately 8,110 pieces of baggage belonging to immigrants from foreign countries were examined, from which 48 lots of fruit and 45 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned fruits and vegetables follows:

Australia:

Dec. 20—1 lot cocoanuts, baggage, fumigated. Precautionary.

China:

Dec. 28—2 lots sugar cane seed, baggage, burned. Prohibited.
 Dec. 28—1 lot beans, baggage, fumigated. Weevils.
 Dec. 28—5 bskt. caladiums, cargo, fumigated. *Aphis*.
 Dec. 29—8 lots, paddy rice, baggage, burned. Prohibited.
 Dec. 29—7 bskt. caladiums, cargo, fumigated. *Aphis*.
 Dec. 29—1 bskt. sweet potatoes, cargo, fumigated. *Aphis*.
 Dec. 29—4 bskt. lily roots, cargo, fumigated. Evidence of infestation.

Japan:

Dec. 5—6 bdl. logs, cargo, fumigated. Evidence of infestation.
 Dec. 7—1 lot Thuya leaves, baggage, burned. Prohibited.
 Dec. 7—1 lot corn, baggage, burned. Prohibited.
 Dec. 7—1 lot plant, baggage, burned. Prohibited.
 Dec. 8—4 bskt. dried chestnuts, cargo, fumigated. Weevils.
 Dec. 8—2 lots green pine leaves, baggage, burned. Prohibited.
 Dec. 20—1 lot plant, baggage, returned. Prohibited.
 Dec. 28—1 pot pine tree, baggage, returned. Prohibited.
 Dec. 28—1 pkg. tree seeds, baggage, burned. Prohibited.
 Dec. 28—1 pkg. horseradish, mail, burned. Decay maggots. *Drosophilids*.

Palmyra Island:

Dec. 20—1 lot bird's nest fern, baggage, burned. Prohibited.

Philippines:

Dec. 5—1 lot plants, baggage, burned. Prohibited.
 Dec. 7—4 pkg. tree seeds, mail to Lyon, fumigated. Precautionary.
 Dec. 20—1 lot coffee cuttings, mail, burned. Prohibited.
 Dec. 22—2 lots corn, baggage, burned. Prohibited.

United States:

Dec. 14—1 pkg. cypress plants, mail, fumigated. *Chionaspis* sp.

HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 7 steamers with 6 carrying vegetable matter consisting of 128 lots and 2,571 parcels, 828 bags of rice and 591 bags of beans arrived from Japan and were passed.

KAHULUI INSPECTION.

Mr. L. Gillin, inspector for Maui, reports the arrival of 5 vessels with all carrying vegetable matter. 16 lots and 3,082 parcels were inspected and passed.

INTER ISLAND INSPECTION.

42 vessels plying between Honolulu and other Island ports were attended and the following inspections made:

PASSED.		REJECTED.	
Taro	366 bags.	Fruit	1 pkg.
Vegetables	126 pkgs.	Sugar Cane	1 pkg.
Fruit	202 pkgs.	Plants	16 pkgs.
Plants	102 pkgs.		
Seeds	2 pkgs.		18 pkgs.
Sugar Cane	15 cases		
<hr/>			
813 pkgs.			

LOCAL FUMIGATION.

During the month we fumigated for various local firms 43 bags of rice, 159 bags of corn, 61 bags of scratch food and 23 cases of bird seed.

Respectfully submitted,

E. M. EHRHORN,
Chief of Division.

DIVISION OF ANIMAL INDUSTRY.

REPORT OF TERRITORIAL VETERINARIAN, DECEMBER, 1921.

January 6, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, H. T.

I beg to submit the following report on the routine work of this Division for the month of December, 1921:

TUBERCULOSIS CONTROL.

During the past month 12 head of cattle were tested, all of which passed the test. This completes the test for 1921 with a total of 3,839 head tested out of which number 3,728 were passed and 111 condemned and branded all of which have been slaughtered giving a percentage of 2.89% for the year.

Out of an average yearly total of cattle tested, the number condemned is the smallest for any year since systematic testing began and for the districts tested the best record so far made in this work. All indications seem to point to a very considerable reduction in the number of animals condemned on test during the coming year.

SWINE DISEASES.

Inspection and vaccination of swine has constituted the major part of the work of the Division during the past month. Outbreaks in various

parts of the island have been investigated, the sick animals treated and the exposed given protective vaccination. Owners have been given advice on the care, diet and improvement of the sanitary conditions surrounding their hogs, which advice if followed will do much to prevent the losses they are now having.

With the aid of the hearty cooperation and assistance of the Chief Sanitary Inspector of the Board of Health we are covering the pig raising districts of the island as rapidly as possible. This aid has been invaluable to our work and through it we expect to be able to rid the Territory of certain places which have for a long time been hot-beds of infection.

The type of disease encountered in the various outbreaks has been the pneumonic form of hemorrhagic septicemia principally, although necrotic enteritis and botulism has been the cause of losses in certain instances. But today's steamer we received a considerable supply of serum and vaccine with which to combat the above conditions.

RABIES PREVENTION.

It is confidentially expected that another month's time will see the completion of a large number of experiments now being undertaken by a number of laboratories in India, Japan, and United States toward the perfection of a method of vaccination for the prevention and treatment of rabies which will simplify to a considerable extent the method now in use in that it will reduce the number of injections from six to one and the period of detention in quarantine after the administration of the vaccine to a fraction of that necessary at the present time.

In the event of a successful conclusion to the above experiments, an amendment to the present dog regulation will be submitted for your consideration.

HAWAII.

From East Hawaii, Dr. Elliot reports as follows:

Port Inspections—S/S Enterprise, San Francisco: 1 cat.

Tuberculosis Control.

During the month of December, a total of 138 head of cattle scattered in 42 dairies were given the tuberculin test with the result that one was condemned and branded. Besides the above testing, autopsies were made on 5 head of previously condemned cattle.

Nothing else of importance occurred in the district during the past month.

WEST HAWAII.

Dr. Rowat reports the testing of 340 head of cattle in 25 dairies mostly in the Kona districts, of which number 14 were condemned.

Besides an outbreak of chicken Cholera in North Kohala district which has caused considerable loss, nothing is reported.

MAUI.

Dr. Fitzgerald reports no outbreaks of infectious disease during the month and the ones previously reported to be well under control.

KAUAI.

Dr. Golding reports that nothing of importance in the line of infectious disease has occurred in his district during the past month.

Respectfully submitted,

LEONARD N. CASE,

Territorial Veterinarian.

**REPORT OF ASSISTANT TERRITORIAL VETERINARIAN
DECEMBER, 1921.**

January 6, 1922.

Dr. Leonard N Case, Territorial Veterinarian.
Board of Agriculture and Forestry,
Honolulu, H. T.

Dear Sir: I beg to submit herewith the following routine report for the month of December 1921:

TUBERCULOSIS CONTROL.

During the past month 12 head of cattle were given the tuberculin test and all passed.

RABIES VACCINATION.

Ten dogs received the rabies treatment at the quarantine station during the past month.

DISTEMPER TREATMENT.

Two Chow dogs received from the Orient were given the Canine Distemper Prophylactic vaccine treatment.

SWINE DISEASE.

During the month all the piggeries in Moiliili, Manoa, Waikiki and Kalihi districts were thoroughly inspected. The majority were found to be in a satisfactory sanitary condition. In some, however, there was room for considerable improvement.

Only a few sick animals were found at the time of inspection but inquiry brought out the fact that a month or two previously quite a number of hogs had died.

The owner of each piggery was instructed that in the future all sickness must be reported immediately to this office.

Inspection were also made at a number of piggeries in Puuloa, Kua-loa Ranch and Kemoo Farm. Two Japanese pig pens at Puuloa were found to be in a filthy condition although the owners had previously been told to clean up.

The pig pens connected with the slaughter houses of C. Q. Yee Hop and C. Y. Hop Wo were inspected and found in good condition both as regards the sanitary condition of the houses and health of the pigs.

HEMORRHAGIC SEPTICEMIA (BOVINE).

Thirteen head of cattle were given a prophylactic injection of hemorrhagic septicemia bacteria in Palolo Valley district.

LIVESTOCK IMPORTATIONS.

Of the thirteen steamers inspected during the month, ten brought the following livestock:

Horses 10; Cattle 47 head; sheep 6; goats 1; dogs 8; cats 1; poultry 330 crates.

Respectfully submitted,
L. E. CASE,
Assistant Territorial Veterinarian.



THE HAWAIIAN FORESTER AND AGRICULTURIST

MARCH, 1922

CONTENTS

	Page
Editorial	63
Appointments	64
Withdrawal of Land From Reserve	64
Biggest Government Timber Sale	64
Chaulmoogra Oil Plantation (Judd), Illustrated.....	65
Division of Forestry	66
Division of Entomology	70
Division of Plant Inspection	71
Division of Animal Industry	72
By Authority	75

VOL. XXIX

PRICE, TEN CENTS

NO. 3

ARNOLD ARBORETUM

JAMAICA PLAIN,

MASS.



The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 207, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy; \$1.00 a year; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,

W. M. Giffard,

H. M. von Holt,

A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*

J. P. Pico, *Forest Ranger for Waissac-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss D. Ruttman, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XXIX.

HONOLULU, MARCH, 1922.

No. 3

The proclamation of a small forest reserve withdrawal is printed in this number.

An ant-proof and mouse-proof propagation house has recently been added to the Hilo forest nursery on Hawaii.

Of the 1,057 head of cattle tested during January for bovine tuberculosis only 1.22% reacted. This establishes a record and indicates progress in the eradication of this disease.

Three shipments of tumble bugs were received by the Entomologist during January and were liberated at Olinda, Maui, where it is hoped they will thrive and assist in the control of the horn fly.

During January the Division of Forestry broke its own record for tree planting by setting out a total of 12,983 trees of six species on six different forest reserves on Oahu, Kauai, and Hawaii.

The fencing of forest reserve boundaries progressed during the month by the construction of 3.73 miles of new fences and by the repairing of 1.22 miles of existing fences.

The Territorial Veterinarian hopes soon to be able to secure a special virus and serum in order to tackle the problem of losses in swine from hemorrhagic septicemia from a different angle by immunizing swine with the serum-simultaneous method of vaccination.

During the month an addition was made to the chaulmoogra oil producing plantation at Waiahole, Oahu, by the planting of 850 trees of the *Taraktogenos Kursii*. A short description of this plantation is contained in this number.

Notice of the appointment of Mr. L. Thornton Lyman of Molokai as Assistant District Fire Warden and Assistant District Forester is printed herewith. This Board is in close cooperation with the Hawaiian Homes Commission in forest work on the Island of Molokai.

APPOINTMENTS.

Mr. L. Thornton Lyman was on March 23, 1922, appointed by the Board as Assistant District Fire Warden in and for the government lands of Palaaui, Hoolehua, Kalamaula, Kapaa-kea, Kamiloloa 1 and 2, and Makakupaia mauka and as Assistant District Forester for the lands of Kalamaula, Kapaa-kea, Kamiloloa 1 and 2, and Makakupaia mauka within the Molokai Forest Reserve on the Island of Molokai.

Mr. Lyman is the Agricultural Expert of the Hawaiian Homes Commission where he is doing excellent work in the agricultural line and he will be of material assistance to this Board in these two positions.

WITHDRAWAL OF LAND FROM RESERVE.

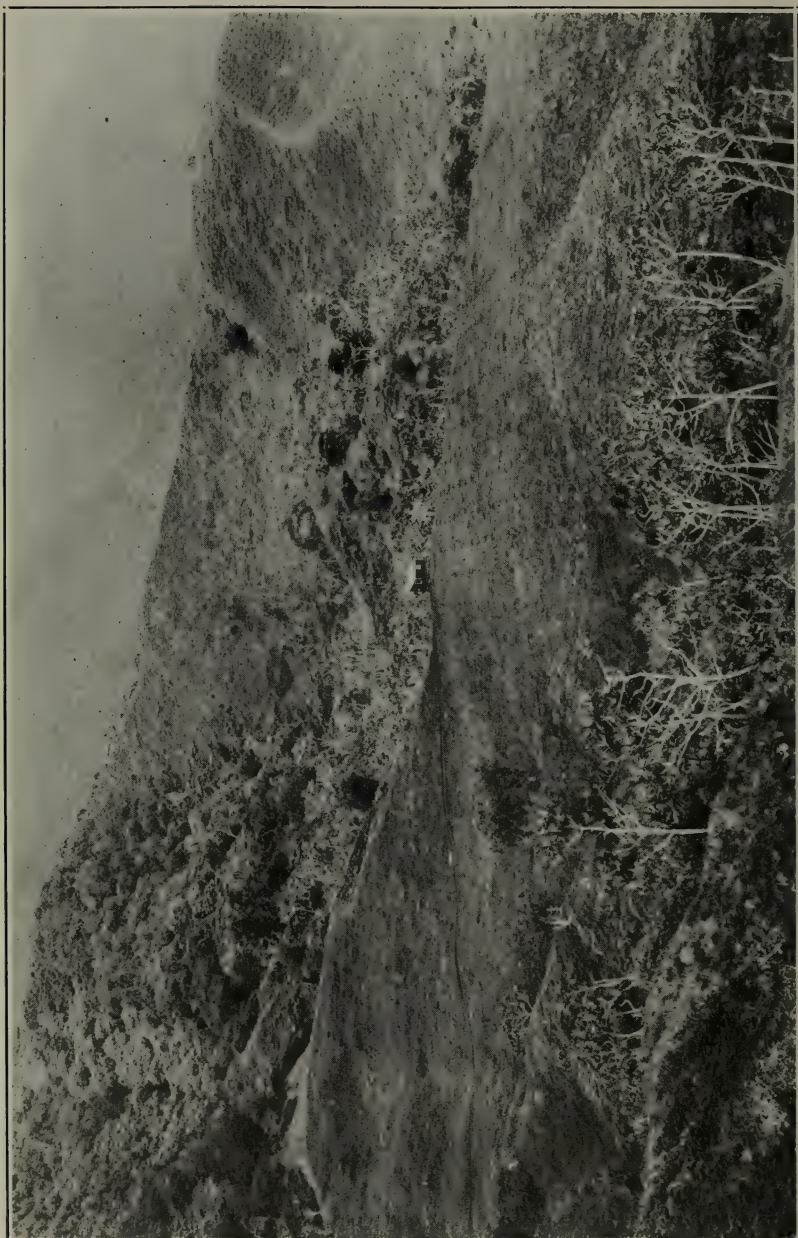
On December 6, 1921, the Board approved the withdrawal of 3,100 square feet of land next to Lot 15, Tantalus Heights from the Honolulu Watershed Forest Reserve, Oahu, at the request of the Commissioner of Public Lands who desired the return of the land to his jurisdiction for exchange purposes.

A public hearing to consider the matter was held on March 17, 1922, and as there was no objection to the withdrawal the governor on March 20, 1922, signed the proclamation, effecting the withdrawal, which is printed on the By Authority page of this issue.

BIGGEST GOVERNMENT TIMBER SALE.

On April 5 a sale of standing timber aggregating one billion board feet was consummated by the U. S. Forest Service in California. This is the largest single timber deal ever made by the government, according to an account in the West Coast Lumberman of April 15. The timber is situated in the eastern part of Lassen County, the purchaser being the Fruit Growers' Supply Company of Los Angeles, a subsidiary of the California Fruit Growers' Exchange. The contract extends over thirty-one years and calls for an annual cut optional from a minimum of 25 to a maximum of 50 million board feet of lumber.

The most striking feature of this huge project, however, is that the contract is the nearest approach to scientific forest harvesting ever made on so large a scale by the U. S. government. Only the ripe timber is to be felled, leaving all the immature trees to form a future crop, and the first logging railroad will tap an area where the timber is ripest on the tract. By proper "forest management" of this timber is meant establishing a balance between the cut and growth over the entire tract. From observation, foresters have determined that an average of 30,000,000 board feet can be cut annually on the "working center" area of which this contract covers one-half, without reducing the growing capacity of the area. It is this maintenance of the growing



Chaulmoogra Plantation at Waiahole, Oahu.
Showing a part of the planting and tool shed.

capacity during continuous harvesting which is the goal of true forestry and is technically known as "sustained yield."

According to official estimate, in the present instance the company will cut over its half of the working center during the life of its contract, and at the end of thirty-one years the balance of the center will be offered for sale. Barring accident, this second half will likewise require thirty years for a complete harvest, at the end of which time the first half of the center will again be ready for the axe. The entire area is thus put upon a sixty-year rotation on a basis of continuous management.

C. J. K.

CHAULMOOGRA OIL PLANTATION.

By C. S. JUDD, *Superintendent of Forestry.*

For the purpose of supplying chaulmoogra oil for the treatment of leprosy in the Territory of Hawaii, the Board of Agriculture and Forestry has recently established a plantation of three species of chaulmoogra oil producing trees on government land in the Waiahole Forest Reserve in the District of Koolau-poko, Oahu.

The planting out of the trees, with a spacing of 20 by 20 feet apart, was begun in December, 1921, and up to the end of March, 1922, 2,360 trees had been set out on an area of 22 acres. There are still on hand 640 trees which will cover an additional area of 6 acres, making the whole plantation 28 acres in area with a total stand of 3,000 trees.

Most of the land where these trees were planted was first plowed and harrowed to insure rapid growth and cultivation will be kept up so as to favor the early production of the valuable seed which should appear on the trees in about eight years.

The seed for these trees was secured by Mr. J. F. Rock and one-half was germinated at the Government Nursery and the other half at the nursery of the Hawaiian Sugar Planters' Association.

The chaulmoogra tree of Siam (*Hydnocarpus anthelminticus*) is most largely represented in this plantation with 2,070 seedlings. The Kalaw tree (*Taraktogenos Kurzii*) of upper Burma comes next with 850 trees. This is the principal tree producing the oil although the oil of the other two species seems to give equally good results. Mr. Rock secured the seed of this chaulmoogra from the region along the upper Chindwin River in Burma. The third species, also called Kalaw, (*Hydnocarpus castanea*) is represented by 80 trees, the seed for which was secured in the Martaban Hills near Moulmein in Lower Burma.

In its native haunts the first species produces fruit throughout the year. Fruit in all stages of maturity and flowers may be found on the same tree. The fruit of the *Taraktogenos Kurzii* which matures only in July is about the size of an orange and is closely packed with from 30 to 40 seeds. From these seeds the valuable chaulmoogra oil is pressed.

DIVISION OF FORESTRY.

REPORT OF SUPERINTENDENT OF FORESTRY, JANUARY, 1922.

Honolulu, Hawaii, February 25, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, H. T.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of January, 1922:

FOREST PLANTING.

Greater progress even than in the previous month was made during January in tree planting and a total of 12,983 trees were set out on six different forest reserves as follows:

Oahu:

Lualualei Reserve at Mikilua—logwood	7,574
• Lualualei Reserve at Mikilua—Australian flame tree	294
Lualualei Reserve at Mikilua—lemon gum	563
Honolulu Watershed at Tantalus—koa	105
Honolulu Watershed at Makiki—koa	250
Pupukea Reserve at Aimuu—koa	2,430
Waiahole Reserve at Waiahole—chaulmoogra (<i>T. Kurzii</i>)....	850

Kauai:

Lihue-Koloa Reserve at Kalaheo—silk oak.....	365
--	-----

Hawaii:

Hilo Forest Reserve at Honohina—lemon gum	302
Hilo Forest Reserve at Kawainui—lemon gum	250

Total number of trees planted12,983

The Hilo Nursery was equipped during the month with a much needed propagation house which was constructed under the supervision of the Forest Nurseryman so that now there should be no further loss of young seedlings from mice attacks or damping-off fungus.

Cooperation with the army was undertaken during the month, at the suggestion of Commissioner Giffard, by the sending of tree seedlings and grass sod from the Hilo Nursery to the Kilauea Military Camp for the improvement and protection of that recreational spot.

FENCING FOREST RESERVE BOUNDARIES.

Steady progress was made in fencing reserve boundaries as will be seen by the following summary of fencing work completed during the month:

New Fences:	Miles.
Hilo Forest Reserve, Piha near Lots 1-4 .....	.41
Hilo Forest Reserve, Opea-Peleau, near Lots 16-17 .....	.37
Hilo Forest Reserve, Kahuku, Lot 16 .....	.11
Olaa Forest Reserve, Olaa Tract, Lot 378	2.84
	<hr/> 3.73
Fence Repairs	Miles.
Olaa Forest Reserve, Hawaii, Sec. C. Ranger Mackenzie .....	.84
Kealia and Moloaa Reserves, Kauai, Ranger Lovell .....	.38
	<hr/> 1.22
Total ..	<hr/> <hr/> 4.95

FIELD WORK.

Most of the month was spent in the office with routine work, reports, and the preparation of a letter to the Governor giving the reasons for the promulgation of Rule V.

One trip was made to Waiahole to inspect the progress of chaulmoogra plantings and to lay out future work and one day was spent in the region of Kuliouou with my assistant and Dr. Lyon in the study of forest conditions there and in marking a part of the boundary of a new forest reserve in that region.

WAILUA COCOANUT GROVE.

The suggestion has been made that the cocoanut grove on about 25 acres of government land at Wailua, Kauai, be made a forest reserve on the expiration of the present lease on June 1, 1922. The opportunity of securing seed nuts free of cost for general distribution throughout the Territory, of obtaining a revenue from the disposal of surplus nuts, and of having a location for the establishment, when funds are available, of a new forest tree nursery which is much needed in this region would be presented by the adoption of this plan.

On my next visit to Kauai I shall look thoroughly into the matter and report fully on it to you.

Respectfully submitted,
C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY, JANUARY, 1922.

February 25, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following routine statement of my activities during January, 1922, is respectfully submitted:

The first four days of the month were spent on Maui in examination of the Makawao Forest Reserve and of the alphabetically arranged Eucalyptus plantations established by Mr. Louis von Tempsky in the intermediate altitudes of Haleakala.

On January 5 I returned to Honolulu and spent the remainder of the month on Oahu, chiefly in the office, upon routine matters and upon the study of data relating to the conifer plantations on Haleakala and

Mauna Kea. Because of confusion in the old planting records, a number of species of pine could not be determined and it was necessary to send them to Mr. Sudworth of the Forest Service in Washington for identification. This will delay the completion of the conifer report by several weeks.

On January 30 a trip was made, in company with Dr. Lyon, Mr. Judd, and Ranger Ellis, up the west ridge of Kuliouou Valley and around the head of the Kuliouou Forest Reserve. With the exception of several badly eroded areas the forest of this region is in excellent condition. A pipe was placed on the ridge marking the east end of the makai-Maunaloa boundary of the proposed Waimanalo Forest Reserve. During this trip two goats, out of three that were seen, were killed.

Respectfully submitted,

C. J. KRAEBEL,

Asst. Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, JANUARY, 1922.

February 24, 1922.

Superintendent of Forestry,

Honolulu, H. T.

Dear Sir: I herewith submit a report of the work during the month of January, 1922:

NURSERY—DISTRIBUTION OF PLANTS

The number of plants distributed, including those sent to forest reserves, are as follows:

	Seed boxes.	In transplant boxes.	Pot grown.	Total.
Oahu:				
Sold ..	.....	.....	107	107
Gratis	3,000	.....	1,965	4,965
				<hr/> 5,072

SUB-NURSERIES.

	Seed boxes.	In transplant boxes.	Pot grown.	Total.
Maui & Molokai	1,602	.....	353	1,955
Kauai ..	.....	.....	4,319	4,319
Hawaii ..	5,500	2,833	.....	8,333
				<hr/> 14,607

Total for all Islands19,679

PLANTING ON GOVERNMENT RESERVES.

Lualualei Reserve—logwood	7,574
Lualualei Reserve—flame tree	294
Lualualei Reserve—lemon gum	563
Total ..	<hr/> 8,431

COLLECTIONS—GOVERNMENT REALIZATIONS.

Sale of plants, Government Nursery, Honolulu	\$ 2.40
Rent of office, Nursery Grounds, for December	35.00

Sale of Plants, Hilo Nursery, Hawaii	6.94
Sale of plants, Kalaheo Nursery, Kauai	4.50
Total ..	<u>\$48.84</u>

PRESERVATION OF FOREST RESERVES.

Kokee Camps, Na Pali-Kona Forest Reserve, Kauai:

Permit fees for year 1922, Camps No. 2, 3, 12, 14, 15, 15A,

24, 25, 31, 32, 33, 34, 37, 38, 48, 49 amounted to\$399.00

This amount was deposited with the Treasurer as a special fund.

ANIMAL INDUSTRY REVOLVING FUND.

Collections made under this amounted to\$1,466.91

PLANTATION COMPANIES AND OTHER CORPORATIONS.

Under this heading 2,000 seedlings were sent to the other islands packed in moss. We have on file, from the other islands, orders for 50,000 seedlings to be shipped in moss when ready.

MAKIKI STATION.

Owing to rainy weather the men employed on the Honolulu watershed assisted at this station when the weather was unfavorable for work outside, consequently much of the needed transplanting was accomplished.

HONOLULU WATERSHED PLANTING.

The work done on the watershed consisted principally of making holes, planting and clearing off at the bottom of Makiki Valley. On a vacant piece of land above the upper reservoir, 250 koa trees were plantd.

HILO TRIP.

On January 4, the writer left Honolulu for Hilo and returned to Honolulu on January 10.

The trip was made for the purpose of drawing up plans and assisting in the building of a propagating house, also setting up and connecting a small steam engine with the boiler installed a short time ago. The boiler and engine were formerly at Makiki and were replaced a short time ago by a larger and more powerful set. A saw table is being built and will be used at the Hilo Nursery for cutting up wood for making seed and transplant boxes, etc. The nursery was found in first class condition, with a large quantity of plants in stock. Considering the scarcity of labor, the demand for trees by a number of plantations is quite encouraging and everything looks well for the future of the nursery.

ADVICE AND ASSISTANCE.

The writer has made the following number of visits and otherwise given advice and assistance to people in and around the city, as follows:

Advice given by telephone	9
Advice given people calling	6
Visits made	8

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY.

REPORT OF ENTOMOLOGIST, JANUARY, 1922.

February 27, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: During the month of January the insectary handled 6,100 pupae of the melon fly, from which there were bred 1,139 females and 1,124 males of *Opius fletcheri*.

The distribution of parasites was as follows:

MELON FRUIT PARASITES.

Opius fletcheri.

Oahu	Females.	Males.
Tomato Field, Kalakaua Ave., Honolulu	200	200
Mr. L. P. Fernandez, Keaau, Waianae	650	650

FRUIT FLY PARASITES.

Diachasma Tryoni.

Oahu: Mr. M. Kawahara, Kalihi, Honolulu	170	160
Hawaii: Caroline S. Bond, Kohala, Hawaii	40	40

Diachasma Fullawayi.

Oahu: Mr. M. Kawahara, Kalihi, Honolulu	150	130
---	-----	-----

Dirhinus Giffardii.

	Males and females.	
Oahu: Mr. M. Kawahara, Kalihi, Honolulu	1,500	
Hawaii: Caroline S. Bond, Kohala, Hawaii	700	

The main work of the Entomologist for this month, was in connection with the shipments of tumble bugs from abroad which have been taken charge of on arrival and cared for until it was possible to turn the beetles out. Three consignments were handled in the month, two from Mexico and one from Australia, and all three lots were liberated at Olinda, Maui. Spare time was devoted to a study of the principal pineapple pests.

Respectfully submitted,

D. T. FULLAWAY.
Entomologist.

DIVISION OF PLANT INSPECTION.

REPORT OF CHIEF PLANT INSPECTOR, JANUARY, 1922.

January 31, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of January, 1922, as follows:

During the month 52 vessels arrived at the Port of Honolulu, 22 of which carried vegetable matter and 10 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests	1,452 lots.	30,564 pkgs.
Fumigated ..	60 "	60 "
Burned ..	32 "	32 "

Total Inspected	1,544 lots.	30,656 pkgs.
-----------------------	-------------	--------------

Of these shipments 30,400 packages arrived as freight, 117 as baggage and 139 as mail.

RICE AND BEAN SHIPMENTS.

10,143 bags of rice and 553 bags of beans from the U. S., and 932 bags of rice and 1,385 bags of beans from Japan arrived, all clean.

PESTS INTERCEPTED.

Approximately 1,835 pieces of baggage belonging to immigrants from foreign countries were examined, from which 7 lots of fruit and 18 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned fruits and vegetables follows:

Australia:

Jan. 18—1 pkg. tree seed, mail to Lyon, fumigated. Precautionary.
Jan. 18—1 bx. cuttings, baggage, burned. Prohibited.
Jan. 28—1 lot grass roots, mail, burned. Infestation.

Borneo:

Jan. 2—1 bskt. pineapple suckers, baggage, to Lyon, CS₂. Free.

China:

Jan. 8—44 bskt. caladiums as food, cargo, fumigated. *Aphis*.

Florida:

Jan. 5—1 orange, baggage, burned. *Lepidosaphes beckii*.

Japan:

Jan. 8—1 pot plant, baggage, burned. Prohibited.
Jan. 8—1 pkg. iris and peony roots, mail, burned. Prohibited.

Pago Pago:

Jan. 18—4 bgs. cocoanuts, cargo, fumigated. Precautionary.

Phillipines:

Jan. 2—2 pkg. tree seeds, baggage to Lyon, fumigated. Precautionary.

Jan. 4—7 pkg. seeds, mail to Lyon, fumigated. Precautionary.

Jan. 8—2 lots oranges, baggage, burned. *Parlatoria pergandii*, *Pseudomonas citri* and *Cladosporium citri*.

Jan. 8—1 bskt. nuts, baggage, fumigated. Precautionary.

HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 6 vessels with all carrying vegetable matter consisting of 117 lots and 2,291 parcels. 50 sacks of potatoes were returned to the mainland because of eel worm and a box of plants was fumigated on account of infestation.

KAHULUI INSPECTION.

Mr. L. Gillin, Maui Inspector, reports the arrival of 4 vessels with 3 carrying vegetables, etc., consisting of 1,835 parcels, 14 lots.

INTER ISLAND INSPECTION.

49 steamers plying between Honolulu and other Island ports were attended and the following shipments passed:

Taro	366 bags.		REJECTED
Vegetables ..	118 pkgs.	Fruit ..	4 pkgs.
Fruit ..	199 pkgs.	Sugar Cane ..	1 pkgs.
Plants ..	158 pkgs.	Plants ..	17 pkgs.
	<hr/>		<hr/>
	841 pkgs.		22 pkgs.

Respectfully submitted,

E. M. EHRHORN,
Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY.

REPORT OF TERRITORIAL VETERINARIAN, JANUARY, 1922.

February 11, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, H. T.

Gentlemen: I have the honor to submit the following report of the routine work of the Division of Animal Industry for the month of January, 1922.

TUBERCULOSIS CONTROL.

During the past month 1,057 head of cattle were tested, out of which number, 1,044 were passed and tagged and 13 condemned and branded. This gives a percentage of 1.22% for the most heavily infected district on the island of Oahu, which establishes a record in this work.

SWINE DISEASES.

Considerable time has been spent in vaccinating hogs in the Koko Head, Kuliouou and Niu districts, with varying degrees of success. A number of reports from the Board of Health have been investigated but no sick pigs were found and no history of the disease could be learned.

In the various outbreaks which have occurred in different sections of the island of Oahu, vaccination has not shown the results which might have been expected. In some herds vaccination has accomplished marvelous results, stopping the losses immediately, and in other herds no apparent benefits have been experienced.

After considerable study of the disease, as it is occurring in these outbreaks, and the poor results obtained in many instances through the present methods of vaccination, the conclusion has been reached that this disease, hemorrhagic septicemia or swine plague, should be handled in the same manner as anthrax, i.e. an attempt to establish a certain degree of immunity through the means of a serum-simultaneous method of vaccination.

Working upon this theory, I have taken up the subject of the production of a special virus and serum with one of the foremost biological laboratories on the mainland. If they will be willing to manufacture such a product under my direction I will conduct a series of experiments to prove whether or not an immunity can be produced, the approximate degree of such an immunity and the length of time it will last.

With such a product we can then tackle the problem from a different angle. Instead of waiting for outbreaks to occur and then treating the herds we can attempt to immunize the herd and by so doing prevent the occurrence of the disease.

In the light of present knowledge this seems to be the logical way to prevent these recurring losses to both the cattle and swine industries.

QUARANTINE STATION.

Considerable change and improvement in the general aspect of the Quarantine Station have taken place during the past month in that the ramshackle buildings which constituted the keeper's cottage were removed, the site of said buildings cleaned up and a new cottage built for the keeper and his family.

The new building, while highly unsatisfactory from the point of view of a finished job, is nevertheless a vast improvement over the former living quarters. The cess-pool should be condemned both as to position and workmanship. Already it has caved in. It is full of water practically all the time and this without ever having been in use. Provision should be made to pump it out frequently or else the odor from it, especially during the summer months, will be far from pleasant.

LIVE STOCK IMPORTATIONS.

Seven head of purebred holstein cattle, imported by C. Brewer & Co., constituted the only shipment of note during the month.

WEST HAWAII.

Dr. Rowat reports that the chicken cholera situation has greatly improved, no new cases having occurred in some time.

During the month two outbreaks of hemorrhagic septicemia occurred on the Parker Ranch. One animal died in the first outbreak and two in

the second. Vaccination of all the exposed animals put an immediate stop to the outbreaks.

On January 23 two cases of glanders were discovered in the Puakea Plantation Company's stables. One of these animals, a mule, was in bad shape and died in a few hours after its discovery; the other, a horse, was a suspect that reacted to the test and was shot. The whole stables, water troughs, etc., have been thoroughly cleaned and disinfected.

It appears that in August, 1921, a case of glanders was found in these stables. Apparently there is some source of infection on these premises. There seems to be a lack of cooperation on the part of the management in that these cases are not promptly reported. The mule above mentioned must have been sick for two or three weeks before it died and in that time could have pretty thoroughly infected the whole premises.

EAST HAWAII.

Dr Elliot reports no cases of infectious diseases in his district.

MAUI.

Dr. Fitzgerald reports that cases of hemorrhagic septicemia have been few and far between. 250 head of cattle on the Haleakala Ranch were immunized against hemorrhagic septicemia and blackleg.

The tuberculosis control work consisted of the testing of 124 head of cattle with one reactor.

KAUAI.

Dr. Golding reports that no infectious diseases of any kind have occurred in his district during the past month.

Respectfully submitted,
LEONARD N. CASE.
Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN, JANUARY, 1922.

February 16, 1922.

Dr. Leonard N. Case, Territorial Veterinarian,
Board of Agriculture & Forestry,
Honolulu, H. T.

Dear Sir: I beg to submit the following report of the work done during January, 1922.

TUBERCULOSIS CONTROL.

One thousand and fifty-seven head of cattle were tested this month, out of which number, thirteen head were condemned and branded.

RABIES CONTROL.

Four dogs were treated with anti-rabies vaccine during January.

SWINE DISEASES.

During this month a considerable number of hogs were treated with anti-hemorrhagic serum and swine plague bacterin. This comprised hogs

in the Koko Head, Kuliouou and Niu Districts and one piggery in the Punchbowl District.

DISTEMPER TREATMENT.

Three Chow dogs were given the prophylactic treatment against canine distemper.

LIVE STOCK IMPORTATIONS.

The following stock was landed at this port this month:

7 head of cattle, 85 crates of poultry, 2 dogs, 1 cat, 2 crates of birds, 5 crates of turtles.

Respectfully submitted,

L. E. CASE,
Assistant Territorial Veterinarian.

BY AUTHORITY.

FOREST RESERVE HEARING.

Notice is hereby given that under the provisions of Chapter 37, R. L. H. 1915, a public hearing will be held by the Governor of Hawaii and the Board of Commissioners of Agriculture and Forestry on Friday, the 17th day of March, 1922 at 2 o'clock p. m. in the office of said Board at the Government Nursery, King Street, Honolulu, T. H. to consider the withdrawal of 3,100 square feet of government land adjacent to Lot 15 on Tantalus Heights from the Honolulu Watershed Forest Reserve in the District of Honolulu, City and County of Honolulu, Island of Oahu.

A map and description of said land are on file in the office of the Superintendent of Forestry where they are open to the inspection of the public. At the said time and place all persons who so desire will be given full opportunity to be heard upon the subject matter of this notice and to present evidence and arguments in person, by proxy, or by letter, either for or against the withdrawal of said land from said reserve.

W. R. FARRINGTON.,
Governor of Hawaii.

The Capitol, Honolulu, T. H.
March 2, 1922.

PROCLAMATION
OF WITHDRAWAL OF CERTAIN LAND FROM THE
HONOLULU WATERSHED FOREST RESERVE
(DISTRICT OF HONOLULU
CITY AND COUNTY OF HONOLULU
ISLAND OF OAHU
TERRITORY OF HAWAII.

Under and by virtue of the authority vested in me by the provisions of Chapter 37 of the Revised Laws of Hawaii of 1915, and of every other power me hereunto enabling, I, WALLACE R. FARRINGTON, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given all as in said laws provided, do

hereby withdraw and eliminate from the Honolulu Watershed Forest Reserve in the District of Honolulu, City and County of Honolulu, Island of Oahu, Territory of Hawaii, created and set apart by Proclamation of the Acting Governor of Hawaii on October 13, 1913, that certain piece of government land adjacent to Lot 15 on Tantalus Heights, containing 3,100 square feet in the District of Honolulu, City and County of Honolulu, Island of Oahu, Territory of Hawaii, more particularly described by and on maps made by the Government Survey Department of the Territory of Hawaii, which said maps are now on file in the said Survey Department marked Government Survey Reg. Map No. 1968 and "Territory of Hawaii to C. B. Cooper, portion of Government land within the Honolulu Watershed Forest Reserve, Tantalus Heights, Honolulu, Oahu," respectively, and description accompanying the same numbered C. S. F. 3326, which said description, now on file in said Survey Department is as follows:

Dr. C. B. Cooper Application to Purchase. Portion of Government Land within the Honolulu Watershed Forest Reserve, Tantalus Heights, Honolulu.

(Executive Order No. 6, Makiki Park and Reservation.)
C. S. F. 3692.

Beginning at the East corner of this piece and the North corner of Lot 15, Tantalus Lots (Grant 4545 to Dr. C. B. Cooper), the coordinates of said point of beginning referred to Government Survey Trig. Station "Nahuina" being 498.8 feet South and 2001.6 feet East, as shown on Government Survey Registered Map No. 1968, and running by true azimuths:—

1. 53° 19' 111.5 feet along Lot 15 (Grant 4545 to Dr. C. B. Cooper);
2. 45° 25' 88.2 feet along same;
3. 161° 35' 15.0 feet along government land;
Thence along top edge of ridge along government land, the direct azimuths and distances being:
 4. 214° 30' 88.0 feet;
 5. 267° 00' 54.0 feet;
 6. 221° 58' 70.9 feet;
7. 337° 00' 15.0 feet along government land to the point of beginning.

AREA 3,100 SQUARE FEET.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed.

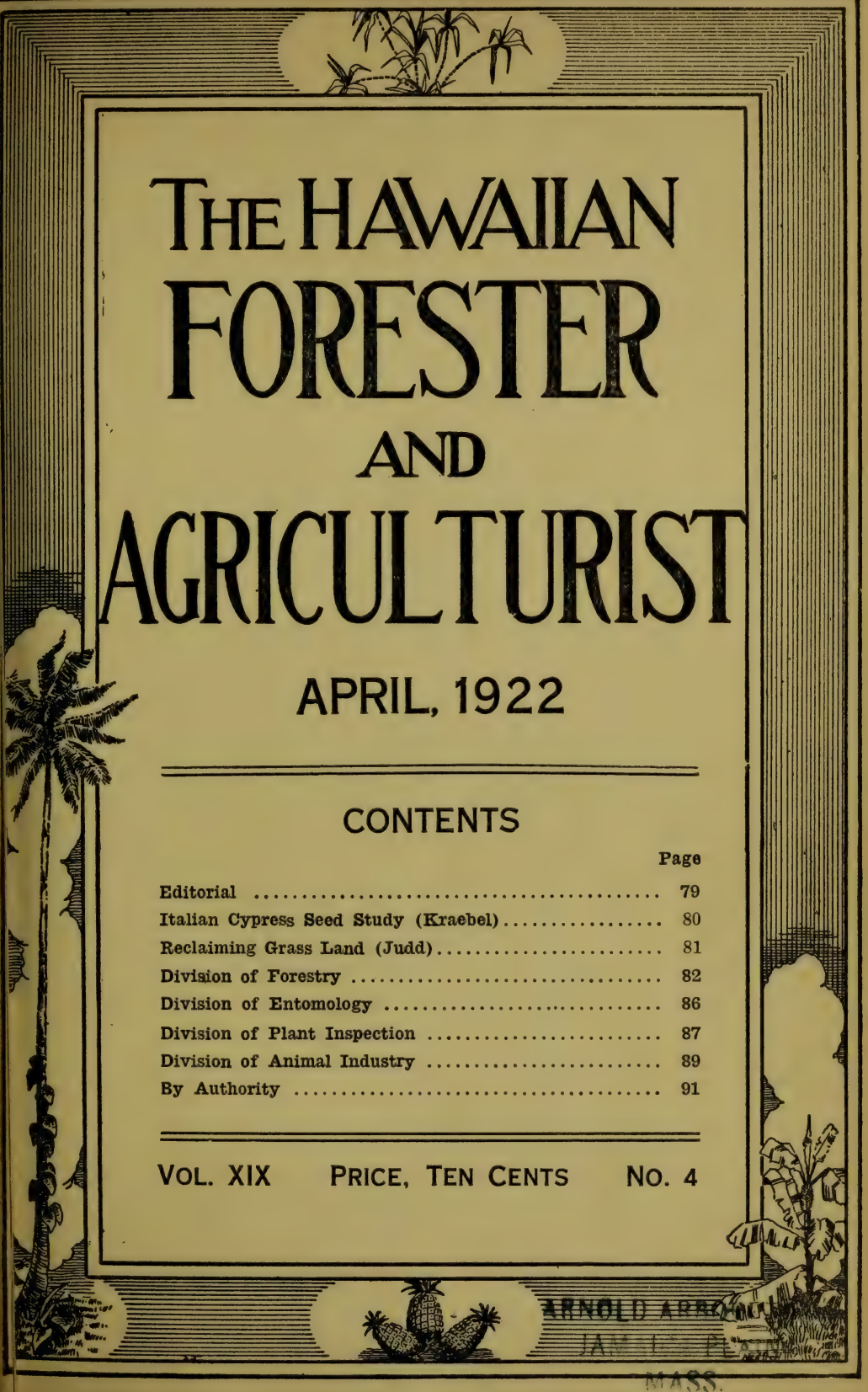
DONE at the Capitol in Honolulu this twentieth day of March, A. D., 1922.

(SEAL)

W. R. FARRINGTON,
Governor of Hawaii.

By the Governor:

RAYMOND C. BROWN,
Secretary of Hawaii.



THE HAWAIIAN FORESTER AND AGRICULTURIST

APRIL, 1922

CONTENTS

	Page
Editorial	79
Italian Cypress Seed Study (Kraebel)	80
Reclaiming Grass Land (Judd)	81
Division of Forestry	82
Division of Entomology	86
Division of Plant Inspection	87
Division of Animal Industry	89
By Authority	91

VOL. XIX

PRICE, TEN CENTS

No. 4

ARNOLD ARBOREAL

JAN 1 1922

MASS.

The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy; \$1.00 a year; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,

W. M. Giffard,

H. M. von Holt,

A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*

J. P. Pico, *Forest Ranger for Waissae-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Elele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss Helen Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX.

HONOLULU, APRIL, 1922.

NO. 4

During February the Division of Forestry planted out 9,551 trees of nine different species on eight forest reserves scattered over Kauai, Oahu and Hawaii.

The Assistant Superintendent of Forestry has initiated a study of local seed of the Italian cypress in the effort to determine a constant source of dependable seed of this much-prized ornamental tree.

The second progress report, printed in this issue, on the experiment for reclaiming grassland in Nuuanu Valley by shading out with haole koa indicates that little may be expected from this operation, at least in such a rainy situation.

Five shipments of tumble bugs, which assist in the control of the horn fly by scattering the dung, were received during the month. Four of these came from our Assistant Entomologist in Mexico and the fifth shipment originated in Australia.

The growing of the pejibaye palm (*Guilielma utilis*) which bears edible seeds will be watched with interest. The U. S. Department of Agriculture recently sent a quantity of seed of this Costa Rican palm to the Division of Forestry for propagation in this Territory.

The amendment to the Division of Animal Industry rules and regulations reducing the quarantine period on dogs which have received the antirabic treatment and the revision of the tuberculin testing regulations which were approved by the Governor on March 30, 1922, are printed on the By Authority pages of this issue.

ITALIAN CYPRESS SEED STUDY

By C. J. KRAEBEL, ASS'T. SUPERINTENDENT OF FORESTRY

The upright Italian cypress, distinguished horticulturally as *Cupressus sempervirens* var. *fastigiata*, is very desirable for the ornamental planting of home grounds and parks and is in much demand for such purposes in the Hawaiian Islands. Difficulty has been experienced in the past in securing seed which can be depended upon to produce the upright form of tree. Commercial seedmen on the mainland are often unable to supply any seed at all of this tree, and such lots as are occasionally obtained from this source do not always produce the desired upright shape of tree. Being a variety, the tree may not be a constant and can therefore not be expected to come true from seed. There is, moreover, the great probability of cross-pollination with other *Cupressus* species such as *macrocarpa*, *macnabiana*, *arizonica*, *funbris* or any of their numerous varieties which are used in ornamental planting.

In the effort to find a constant source of dependable seed, the idea was hit upon of gathering seed from trees now growing in Hawaii. Although there are a considerable number of well developed Italian cypresses of good upright form growing in Honolulu, none of these has been known to produce seed. On the island of Maui, however, there are numerous old plantings of these trees at altitudes sufficiently high so that cones are produced in large quantities. These trees offered a possible source of seed, and it was to discover whether the seed of any of them could be depended upon to reproduce the form of the parent tree that the present experiment was initiated.

Seed collection, in October, 1921, was not restricted to the upright form alone but included also the spreading, pyramidal or "pagoda" forms which have a distinct and useful place in decorative planting. In most cases both upright and spreading forms are growing in close proximity so that cross-pollination is highly probable, and interesting results may be expected.

The following is a list of localities and trees from which cones were collected:

1. Ulupalakua (Prospect Hill) Altitude 2,600 feet.
Upright form. Old and new cones from a large old tree of very good upright form at the summit of Prospect Hill.
2. Ulupalakua (Mausoleum Hill) Altitude 2,000 feet.
Upright form. Old cones from an old tree at the mauka front corner of the mausoleum.
3. Idlewilde. Altitude 4,200 feet.
Upright form. Old cones from two well-formed upright trees.
4. Idlewilde. Altitude 4,200 feet.
Pyramid form. Old and new cones from two pyramid or pagoda shaped trees.

5. Olinda. Altitude 4,000 feet.

Upright form. Old and new cones from a very small tree.

6. Olinda. Altitude 4,000 feet.

Pointed pyramid form. Old cones from a slender pyramidal tree which looks like a cross between the upright and pyramid forms.

Incidental to the experiment a germination test is being made of the seed of old and "new" or young cones from the same trees. A characteristic of trees of the genus *Cupressus* is the persistence of their cones for many years so that often the ancient clusters are overgrown with lichens. It is hardly to be expected that seed from such cones will have as high a germination percentage or produce as vigorous seedlings as the seed of two or three-year old cones. Preliminary tests of the Ulupalakua samples, which are from some of the most desirable trees, have shown fair germination.

If the development of the seedlings warrants it, the study will be continued by out-planting a number of each lot in an aboretum for future observation.

RECLAIMING GRASS LAND SECOND PROGRESS REPORT

BY C. S. JUDD, SUPERINTENDENT OF FORESTRY.

The plots in Nuuanu Valley established on March 17, 1921, to determine whether areas covered with Hilo grass could be reclaimed by shading out the grass through the establishment of a stand of haole koa trees (*Leucaena glauca*) were examined on March 18, 1922, to determine the progress that this tree had made against the grass by the end of the first year since the seed was sown.

During the period of six months since last examination, the first half had been comparatively dry but considerable rain had fallen during the second half.

The results of the last examination are not promising for the success of the trees in overcoming the grass. Most of the seedlings had been overtopped by the grass and completely shaded out and killed while others had spread out along the ground in the effort to find an opening to sunlight through the grass. The largest seedling was found on Plot 8 and was 24 inches long above ground with a root of corresponding length. It also possessed a flower bud.

At the initiation of the experiment the grass on Plots 4, 5 and 6 was merely burned but on Plots 7, 8, and 9 not only was the grass burned but the ground was dug up and the sod turned over. This treatment seems merely to have stimulated the growth of the Hilo grass because after one year's time the grass on these plots stands so thick and high that it forms almost as complete a cover as the grass on Plots 1, 2 and 3 which was left undisturbed.

Moreover, the grass was found to be the breeding place of the cutworm (*Spodoptera exigua*) for it was thickly infested with both adults and grubs of this pest.

The results of the count after the lapse of one year were as follows. On Plots 1 to 3, no seeds germinated in the untreated grass.

Plot No.	Seedlings Found After		Percentage of Original Sowing	
	6 mos.	12 mos.	At 6 mos.	At 12 mos.
4	84	31	10	4
5	172	74	10	4
6	292	71	12	3
7	110	52	13	6
8	232	76	14	4
9	240	139	10	5

The remarkably fast growth of Hilo grass during the second half year of the experiment reduced the percentage of original sowing of seedlings found at the end of the first half year in every case, ranging from as high as 10 per cent to as low as 5 per cent according to the different plots.

The conclusion which may be drawn at the end of the first year of the experiment is that in a region such as this which is so favorable to the rapid growth of the grass, little may be expected in shading out the grass by attempting to establish a stand of haole koa by sowing after burning the grass or after burning it and digging up the ground.

It is possible, however, that the remaining seedlings will survive long enough to overtop the grass and as a thin and scattered stand eventually attain this end. For this reason, the plots will be kept under observation for another two years.

DIVISION OF FORESTRY

REPORT OF THE SUPERINTENDENT OF FORESTRY, FEBRUARY, 1922

Honolulu, Hawaii, March 31, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of February, 1922:

FOREST PLANTING

The planting out of trees on denuded areas in the forest reserves continued at a good rate during February. A total of 9,551 trees was planted out on eight different forest reserves on the islands of Oahu, Kauai and Hawaii, as follows:

Oahu:

Lualualei Forest Reserve at Makilua—logwood ..	2,113
Lualualei Forest Reserve at Mikilua—red gum ..	1,067
Pupukea Forest Reserve at Paumalu—koa ..	2,880
Honolulu Watershed Forest Reserve at Makiki—koa ..	320

Waiahole Forest Reserve at Waiahole—chaulmoogra (<i>H. Castanea</i>)	80
Waiahole Forest Reserve at Waiahole—Moreton Bay fig	450
Waiahole Forest Reserve at Waiahole—koa ..	1,235
Waiahole Forest Reserve at Waiahole—lemon gum	90
Waiahole Forest Reserve at Waiahole—maneie (<i>Sapindus saponaria</i>)	100
Kauai:	
Lihue-Koloa Forest Reserve at Kalaeo—silk oak	400
Kealia Forest Reserve at Anahola—silk oak	200
Hawaii:	
Hilo Forest Reserve at Kamae—Moreton Bay fig	200
Hilo Forest Reserve at Kaiwika— <i>Ficus henneana</i>	250
Olaa Forest Park Reserve at Sec. C—chaulmoogra (<i>H. Castanea</i>)	30
Olaa Forest Park Reserve at Sec. C—lemon gum	136
Total number of trees planted	9,551

The establishment of the chaulmoogra oil producing plantation at Waiahole is nearing completion. Owing to the necessity for economizing on our funds, all of the extra labor that had been hired for this project was discharged at the end of the month with the exception of two men who will be able to plant the remaining trees and keep the plantation in proper condition by cultivation.

At the Haiku Nursery we are getting ready 1,000 Norfolk Island pines for early shipment to Molokai where the Hawaiian Homes Commission has asked for cooperation in establishing windbreaks.

Some time was spent in the preparation of a plan whereby in return for the privilege of gathering macadamia nuts from a plantation of 20 acres of trees to be established on the Round Top Forest Reserve, the balance of the reserve will be reforested under our direction without further cost. This has been presented to you in a separate communication.

On February 9, we received from the Department of Agriculture a shipment of 200 seeds of the pejiyaye (*Guiljelma utilis*), a palm tree of Costa Rica which produces edible seeds. These have been sown and if successfully raised will be distributed for planting throughout the Territory.

FOREST FENCING

Progress is being made in the construction of new fences on the adjusted makai boundary of the Hilo Forest Reserve. One stretch of new fence was completed at the end of the month at Kaiwika on the mauka boundary of Lot 68. This is .36 mile long and will prevent the further trespass of cattle in the Hilo Reserve at this point.

Negotiations were begun with the Hawaiian Evangelical Association for the voluntary fencing of the boundary of the Hilo Forest Reserve at the southeast corner on the land of Punahoa 2nd at the headwaters of the Olaa flume and with the owners of lands adjacent to the Mokuleia Forest Reserve, Oahu, for the cooperative fencing of the makai boundary of this reserve.

It has been reported to me that a start has been made in the construction of the fence required to be built on a part of the Kula Forest Reserve on Maui. Mamani posts for this fence are now being cut and the American fence wire has been ordered.

RULE V

Considerable time was given to matters connected with Rule V pertaining to the protection of the water and forest on the city watershed at the head of Palolo and Manoa Valleys. A special effort has been made

to get into good shape the minutes of the meeting of February 14, when the protests of the Hawaiian Trail and Mountain Club to the rule were heard. Comments on these protests will be submitted to you as soon as they can be properly prepared.

GRASS CUTTING ON TANTALUS

Owing to the complaints which have been received against the grass cutters who are ruining the roads on Tantalus, an effort was made to eliminate all grass cutting in this region by enlisting the aid of the owners of private property on Tantalus. A circular letter was addressed to these owners asking whether they granted permission to cut grass on their lands and pointing out the advisability of discontinuing the practice. To date replies have been received from 26 of the 37 owners and each reply has been to the effect that no such permission to cut grass has ever been given.

MOLOKAI TRIP

From February 8-10, I was on Molokai at the request of the Hawaiian Homes Commission giving advice on tree planting in connection with the new areas to be opened up to agricultural entry and investigating the needs for further forest protection to assure the continuity of the water supply which this commission plans to utilize from the Waihanau Stream. A special report on this matter will soon be submitted for your consideration.

TREE TRIMMER

At the request of the Outdoor Circle, Mr. John D. Griffin was recommended by my assistant as a suitable man to look out for the interest of that organization in street tree trimming work. Mr. Griffin is a trained horticulturist and formerly worked with the U. S. Forest Service in Oregon. He has accepted the position offered to him and will soon report for work in Honolulu.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY, FEBRUARY, 1922

March 17, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following statement of my activities during February, 1922, is respectfully submitted:

The entire month was spent on the island of Oahu, largely upon accumulated office work in Honolulu. Among the projects given attention were: the office study of data on the experimental plantations of temperate zone conifers, compilation of Hilo Forest Reserve map by the Survey Office, consideration of objections to Rule V raised at the Board's hearing on February 14, and cooperation with the Outdoor Circle of Honolulu in securing an expert to care for the city shade trees.

Two short field trips were made, one on February 7, to Kunia to recover a number of forest reserve monuments which had been stored there some years ago; and one on February 20, with the Superintendent of Forestry, to inspect a forest area through which it has been proposed to build a military road.

Respectfully submitted,

C. J. KRAEBEL,
Asst. Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, FEBRUARY, 1922

March 17, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: I herewith submit a report of the work during the month of February:

NURSERY—DISTRIBUTION OF PLANTS

The number of plants distributed, including those sent to forest reserves, are as follows:

Oahu:

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Sold	5,000	50	184	5,234
Gratis			4,392	4,392
				<u>9,626</u>

SUB-NURSERIES

Maui and Molokai	1,300	179	1,479
Kauai ..	3,000	2,129	5,129
Hawaii ..	1,000	1,384	2,384
			<u>8,992</u>

Total for all Islands18,618

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of plants, Government Nursery, Honolulu	\$ 8.40
Rent of Office, Nursery Grounds	35.00

Total .. \$43.40

PRESERVATION OF FOREST RESERVES—KOKEE CAMPS, KAUAI

Permit fee for 1922, Kokee Camp Site No. 16	\$ 4.00
Permit fee for 1922, Kokee Camp Site No. 17	7.00
Permit fee for 1922, Kokee Camp Site No. 21	4.00
Permit fee for 1922, Kokee Camp Site No. 35	8.00
Permit fee for 1922, Kokee Camp Site No. 36	6.00
Permit fee for 1922, Kokee Camp Site No. 46	7.00

Total .. \$36.00

ANIMAL INDUSTRY REVOLVING FUND

February 1, Haleakala Ranch through Dr. L. N. Case, vaccine	\$195.50
February 1, Haleakala Ranch through Dr. L. N. Case, vaccine	79.00
February 6, Dr. L. N. Case, vaccine	63.50
February 6, Dr. L. N. Case, vaccine	12.65
February 11, Parker Ranch through Dr. L. N. Case, vaccine	475.00
February 14, J. Ashley through Dr. L. N. Case, vaccine	34.00
February 15, Raymond Ranch through Dr. L. N. Case, vaccine ..	17.00
February 17, Dr. L. N. Case, vaccine	9.50
February 27, Dr. L. N. Case, vaccine	6.00

Total .. \$892.15

MAKIKI STATION

The work done at this station has been principally routine. We are building up our stock and will soon have a good supply of everything on hand.

TREES PLANTED IN FOREST RESERVES

Honolulu Watershed

Trees planted at top of Makiki Main Valley amounted to 320 koa. Other work done consisted of clearing land and clearing and repairing trails.

Kauai

Mr. Joe Rita, Jr., in charge of the nurserv at Kalaheo, reports that he planted 400 silk oak trees during the month of February.

Lualualei Forest Reserve.

Mr. J. K. Luka reports the following trees planted during February:

Eucalyptus rostrata	1,067
Logwood ..	2,113
Total ..	3,180

ADVICE AND ASSISTANCE

The writer was called upon and given advice and assistance at the request of people in and around the city.

Calls made	6
Advice by telephone	8
Advice given people calling at Nursery	10

The writer spent two days judging school gardens on Oahu in connection with the Star-Bulletin School Garden Contest.

Respectfully submitted,
DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY

REPORT OF ENTOMOLOGIST, FEBRUARY, 1922

March 16, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: During the month of February the insectary handled 6,500 pupae of the melon fly, from which there were bred 797 females and 888 males of *Opisus fletcheri*.

The distribution of the parasites was as follows:

MELON FLY PARASITES

Opisus fletcheri

	Females.	Males.
Oahu:		
Mr. L. P. Fernandez, Keeaau, Waianae	250	250
Molokai:		
Mr. L. T. Lyman, Kaunakakai, Molokai	200	200

Oahu:

	Females	Males
Mr. M. Tamura, Waianae	150	150
Mr. M. Kawahara, Kalihi, Honolulu	60	50

FRUIT FLY PARASITES

Dirhinus Giffardii.

Oahu:

	Females and Males.
Mrs. Spencer, Nuuanu Ave., Honolulu	500

Galesus Silvestrii

Oahu:

	Females and Males.
Mrs. Spencer, Nuuanu Ave., Honolulu	750

Tetrastichus Giffardianus

Oahu:

	Females and Males.
Mr. M. Kawahara, Kalihi, Honolulu	600

The Entomologist's work this month has been along the same lines as in the previous month. Five shipments of tumble bugs were received during the month, four from Mexico and one from Australia. One lot was liberated on Kauai on the Grove Farm Ranch, (Kilohana Crater Pasture), the others on Maui, one at Olinda, another in the Pa Gomi Pasture of the Haleakala Ranch. Two of the lots arrived in poor condition, due to improper storage enroute.

Respectfully submitted,
D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION

REPORT OF THE CHIEF PLANT INSPECTOR, FEBRUARY, 1922

February 28, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of February, 1922, as follows:

During the month we boarded 38 vessels, 21 of which carried vegetable matter and 5 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	1,439 lots.	18,188 pkgs.
Fumigated ..	10 lots.	10 pkgs.
Burned ..	110 lots.	110 pkgs.
Returned ..	3 lots.	3 pkgs.

Total Inspected	1,562 lots.	18,311 pkgs.
-----------------------	-------------	--------------

Of these shipments 17,803 packages arrived as freight, 269 as baggage and 239 as mail.

RICE AND BEAN SHIPMENTS

24,638 bags of rice and 605 bags of beans from the U. S., and 3,017 bags of rice and 4,172 bags of beans from Japan arrived, all clean.

PESTS INTERCEPTED

Approximately 2,625 pieces of baggage belonging to immigrants from foreign countries were examined, from which 48 lots of fruit and 59 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned fruits and vegetables follows:

China

Feb. 1. 5 bskt. caladiums, cargo, fumigated. *Aphis*.

Federated Malay States

Feb. 7. 2 bgs. cocoanuts, cargo, fumigated. Precautionary.

Japan

Feb. 1. 5 bdl. logs, cargo, fumigated. Ants and borers.

Feb. 1. 1 lot corn, baggage, burned. Prohibited.

Feb. 22. 1 pkg. plant, baggage, burned. Prohibited.

Feb. 22. 2 pkg. plant, baggage, returned. Prohibited.

Philippines

Feb. 7. 2 pkg. seeds, mail, fumigated. Weevil indication.

Feb. 22. 1 pkg. seeds, mail, fumigated. Precautionary.

South America

Feb. 14. 1 pkg. corn, baggage, burned. Prohibited.

United States

Feb. 8. 1 pkg. plant, baggage, returned. *Pseudococcus maritimus*, *pseudococcus longispinus*, *hemichionaspis aspidistrae*.

HILO INSPECTION

Brother M. Newell, Inspector at Hilo, reports the arrival of 6 vessels with all carrying vegetable matter consisting of 198 lots and 3,145 parcels. 75 sacks of potatoes in very poor condition were ordered sorted and then released.

KAHULUI INSPECTION

Mr. L. Gillin, Inspector for Maui, reports the arrival of 4 vessels with 3 carrying vegetable matter consisting of 20 lots and 614 packages, all clean.

INTER ISLAND INSPECTION

47 steamers plying between Honolulu and the other islands were attended and the following inspections made:

PASSED		REJECTED	
Taro	267 bags.	Sugar cane	5 pkgs.
Vegetables ..	87 pkgs.	Fruits	1 pkg
Fruits ..	237 pkgs.	Vegetables ..	1 pkg
Plants ..	168 pkgs.	Plants ..	8 pkgs.
Seeds ..	4 pkgs.		
Sugar cane	21 cases.		
	<hr/>		<hr/>
	784 pkgs.		15 pkgs.

Respectfully submitted,
E. M. EHRHORN,
Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

REPORT OF TERRITORIAL VETERINARIAN, FEBRUARY,* 1922

March 20, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I have the honor to submit herewith, the following routine report for the month of February:

TUBERCULOSIS CONTROL

As will be seen from the appended report of the Assistant Territorial Veterinarian, a total of the 1,416 head of cattle were tested during the past month with a total of 23 reactors. This gives a percentage of 1.62% for the month.

Besides the above testing, autopsies were performed on a total of 30 head of condemned cattle.

SWINE DISEASES

The swine situation has improved considerably during the past month. Numerous inspections in various parts of the island have failed to reveal any sick hogs or any evidence of recent sickness with the exception of a small outbreak at Kahuku, with a mortality of three head, and an outbreak on the windward side of the island entailing considerable loss, especially among small pigs.

With the advent of warmer weather and clear days, sickness among hogs will entirely disappear. This has been the history of these outbreaks for many years. The cold, inclement seasons are almost invariably accompanied by a more or less heavy mortality among swine. Prevention, more than treatment, must be relied upon in controlling this loss.

Sanitation is the dominant factor in the prevention of swine diseases. A place may look clean and still be far from sanitary. The most competent judge of the sanitary conditions of a place, is the trained sanitarian and when sound, practical advice is given by such an expert and changes recommended tending toward the improvement of the sanitary conditions under which live stock is being bred and raised, it is well to listen to it and still better to follow it.

QUARANTINE STATION

The work of reconditioning the quarantine station is steadily progressing. Certain changes in the way of improvement have been made. The row of stalls, which were in a very dilapidated condition, have been removed and several box stalls will be erected for cattle heavy in calf or recently calved, assuring them the quiet, individual attention and protection they demand while undergoing treatment.

A chute has been constructed for the testing and examination of cattle while in quarantine thus doing away with chasing and roping in the corrals.

When the reconstruction already planned has been completed and a coat of stain applied, a vast improvement in the general condition of the station will have been accomplished.

MAUI

Dr. Fitzgerald reports an outbreak of hemorrhagic septicemia on the Raymond Ranch with the death of a few yearlings and calves. A total

of 592 head of in-contact animals were immunized. No deaths subsequent to vaccination have been reported.

A small outbreak of keratitis in cattle was reported from Waiopai section of the Haleakala Ranch, resulting in 9 deaths. Starvation due to blindness being the principal cause of death. The condition yielded readily to treatment.

In tuberculosis control work, a total of 71 head of cattle were tested with no reactors.

EAST HAWAII

No outbreaks of infectious and contagious diseases have been reported by Dr. Elliot as occurring in his district during the past month.

WEST HAWAII

Dr. Rowat reports the occurrence of several outbreaks of hemorrhagic septicemia in cattle in his district during the month. The mortality was small and the outbreaks easily controlled through vaccination.

KAUAI

Dr. Golding reports that no outbreaks of disease have occurred in his district during the past month.

Respectfully submitted,
LEONARD N. CASE,
Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN, FEBRUARY, 1922

March 20, 1922.

Dr. Leonard N. Case, Territorial Veterinarian,
Board of Agriculture and Forestry,
Honolulu, T. H.

Sir: I beg to submit the following report of work done during the month of February, 1922:

TUBERCULOSIS CONTROL

During this month fourteen hundred and sixteen head of cattle were tuberculin tested of which number twenty-three head reacted.

RABIES TREATMENT

Four dogs were given the anti-rabies treatment.

SWINE DISEASES

Inspections of piggeries were made in the following districts: Kahuku, Mokapu, Pearl Harbor and Puuloa. Sick hogs were found and treated at Kahuku and Mokapu.

LIVE STOCK IMPORTATIONS

The following live stock was landed at this port: Dogs 6; Cattle 19; Jacks 1; Poultry 52 cts.; Sheep 4.

Respectfully submitted,
L. E. CASE,
Asst. Territorial Veterinarian.

BY AUTHORITY**DOG QUARANTINE****TERRITORY OF HAWAII****BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY
DIVISION OF ANIMAL INDUSTRY**

Amendment I to D. A. I. Order I, Regulations Governing the Inspection and Quarantine of Horses, Cattle, Sheep, Swine and other Animals Imported into the Territory of Hawaii, Permitting a Reduction in the Time Required for Dogs to Remain in Quarantine while Undergoing Antirabic Treatment.

Under the authority of SECTION 503 of the Revised Laws of Hawaii, 1915, the regulations of the Board of Commissioners of Agriculture and Forestry governing the inspection and quarantine of horses, cattle, sheep, goats, swine and other animals imported into the Territory of Hawaii and effective July 21, 1921, are hereby amended as follows:

SECTION 2 OF REGULATION 9 is changed to read as follows:

SECTION 2: Dogs undergoing antirabic treatment shall remain in quarantine after vaccination until the Territorial Veterinarian shall certify that the treatment is producing the desired result.

SECTION 7 of REGULATION 9 is modified by the addition after the word "shipment" in line eight, of the words, "or has been immunized against rabies by any other recognized and reliable method of vaccination."

These amendments shall become effective upon approval by the Governor.

Adopted on Thursday, March 30, 1922 by the Board of Agriculture and Forestry.

A. L. C. ATKINSON,
President.

Approved this 30th day of March, 1922,
Honolulu, T. H.

W. R. FARRINGTON,
Governor of Hawaii.

TUBERCULIN TESTING**TERRITORY OF HAWAII****BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY
DIVISION OF ANIMAL INDUSTRY**

Regulations Governing the Tuberculin Testing of Animals, the Condemnation, Appraisal and Slaughter of Reactors and Expenditures on account of the Control and Eradication of Bovine Tuberculosis.

Under authority conferred by law upon the Board of Commissioners of Agriculture and Forestry, the following regulations are hereby promulgated to govern the tuberculin testing and slaughter of animals and expenditures on account of the control and eradication of bovine tuberculosis, which for the purposes of identification shall be known as D. A. I. Order No. 3 and shall supersede D. A. I. Order No. 1, dated July 6, 1920.

REGULATION 1—DEFINITIONS

For the purposes of these regulations the following words, names and terms shall be construed, respectively, to mean:

SECTION 1—Animals—Cattle.

SECTION 2—Disease—Bovine tuberculosis.

SECTION 3—Reactor—An animal proven by physical examination or the tuberculin test to be affected with tuberculosis.

SECTION 4—The Board—Board of Commissioners of Agriculture and Forestry.

SECTION 5—Territorial Veterinarian—Refers to the Chief of the Division of Animal Industry and his Assistants.

SECTION 6—Cooperation—Compliance on the part of the owner with all rules and regulations issued by the Board pursuant to the control and eradication of bovine tuberculosis.

REGULATION II—APPLICATION OF TEST

SECTION 1. All dairy cattle, within the confines of this Territory, more than six months old and all other cattle suspected of being affected with tuberculosis shall be tuberculin tested by the Territorial Veterinarian.

Section 2. All cattle so tested shall be ear marked with a tag of registered design at the time of injection and the reactors braided as by law required.

REGULATION III—OWNERS COOPERATION

SECTION 1. The owner shall cooperate with the Territorial Veterinarian by facilitating his access to the cattle to be tested. He shall attend to the confinement of the cattle at such times as shall be required by the Territorial Veterinarian and shall supply necessary assistance for the safe and effective application of the test.

SECTION 2. The owner shall further cooperate in carrying out the provisions of these regulations by keeping his premises in a clean and sanitary condition. By this is meant that the stables, sheds and enclosures be kept as by the Sanitary Code of the Territory required. Paddocks and pastures shall be rendered sanitary by the removal of all animals reacting to the tuberculin test.

SECTION 3. After the removal of all reactors the owner shall cause the barns, stables, pens, barn-yards and other enclosures where tuberculous animals have been kept, also cars and other conveyances to be thoroughly cleaned and disinfected in accordance with such directions as the Territorial Veterinarian may consider necessary.

SECTION 4. The owner shall immediately segregate and subsequently deliver for slaughter all reactors at such time and place as may be designated by the Territorial Veterinarian.

SECTION 5. All expense connected with the segregation and delivery of reacting cattle for slaughter and the cleaning and disinfection of premises contaminated by such cattle shall be borne by the owner.

REGULATION IV—QUARANTINE

SECTION 1. In case the owner neglects or refuses to properly clean and disinfect his premises the Board may proclaim such premises, including all live stock thereon and all products obtained therefrom, to be in a state of quarantine, said quarantine to remain in effect until the owner has complied with all the necessary requirements.

SECTION 2. All expense connected with the quarantine of such premises shall be borne by the owner of the live stock quarantined.

REGULATION V—APPRAISAL OF ANIMALS

SECTION 1. The appraisal of reactors shall be in accordance with SECTION 3 of ACT 128 of the 1921 Session Laws and shall be reported on forms provided for the purpose.

REGULATION VI—DISPOSAL OF ANIMALS

SECTION 1. All condemned animals shall be segregated and slaughtered within a reasonable time after appraisal. The slaughter and inspection shall be under the direct supervision of the Territorial Veterinarian and in accordance with the meat inspection regulations of the Federal Bureau of Animal Industry.

SECTION 2. After slaughter and inspection the carcass, or such parts thereof which are found to be wholesome, shall be sold at the best price obtainable for that class of meat and the proceeds of such sale, after the expense of marketing has been deducted, shall be paid to the owner.

REGULATION VII—INDEMNIFICATION

SECTION 1. The amount of indemnification shall be based upon the results of the post-mortem inspection and shall be in accordance with the provisions of SECTION 5 of ACT 128 of the 1921 Session Laws and shall be reported on forms provided for the purpose.

REGULATION VIII—CLAIMS NOT ALLOWED

SECTION 1. No claim shall be allowed arising out of the condemnation of cattle on a tuberculin test applied by other than the Territorial Veterinarian.

SECTION 2. No claim for compensation shall be allowed unless the Board is satisfied that the owner's premises have been kept in a sanitary condition and that said owner has cooperated with the Board in complying with its rules and regulations.

SECTION 3. No claim for compensation shall be allowed until the sanitary and hygienic conditions of the infected premises have been approved by the Territorial Veterinarian.

SECTION 4. No claim for compensation shall be allowed for any imported animal condemned on retest while in quarantine, or for any imported animal after release from quarantine if such animal is placed in an infected herd, unless such animal is found upon post-mortem examination not to be affected with tuberculosis.

SECTION 5. No claim for compensation shall be allowed any owner of tuberculous animals whose entire herd has not been tested in accordance with these regulations and the reactors slaughtered.

SECTION 6. No claim for compensation shall be allowed for any animals destroyed on account of tuberculosis unless such claim be executed upon vouchers approved by the president of the Board and supported by the forms required by these regulations.

REGULATION IX—COOPERATIVE AGREEMENT

SECTION 1. The Bureau of Animal Industry of the United States Department of Agriculture and the Division of Animal Industry of the Bureau of Agriculture and Forestry, for the purpose of improving the dairy and beef breeds of cattle in the Territory of Hawaii, encouraging recognition of the importance of maintaining such herds free from tuberculosis and promoting the interchange of healthy cattle, agree, so far as available funds permit, to cooperate in assisting breeders of such cattle to eradicate tuberculosis from their herds and to maintain officially tuberculosis-free accredited herds.

SECTION 2. Cooperation with the Federal Bureau of Animal Industry shall be in strict accordance with their regulations on the subject.

Any person violating the above regulations shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed five hundred dollars (\$500.00), as provided by Sec. 529, Revised Laws of Hawaii of 1915.

These regulations shall become effective upon approval by the Governor.

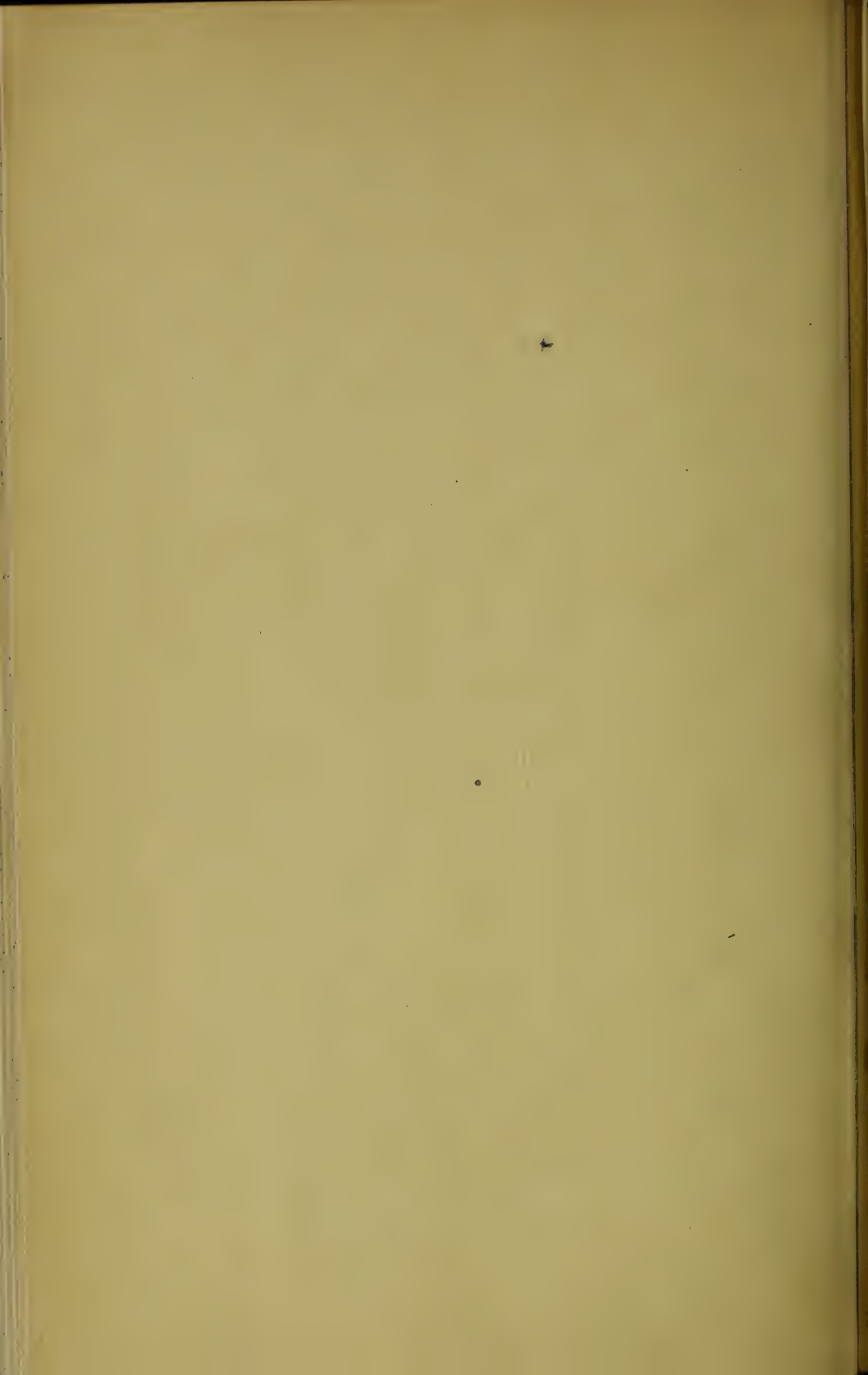
Adopted on Thursday, March 23, 1922, by the Board of Agriculture and Forestry.

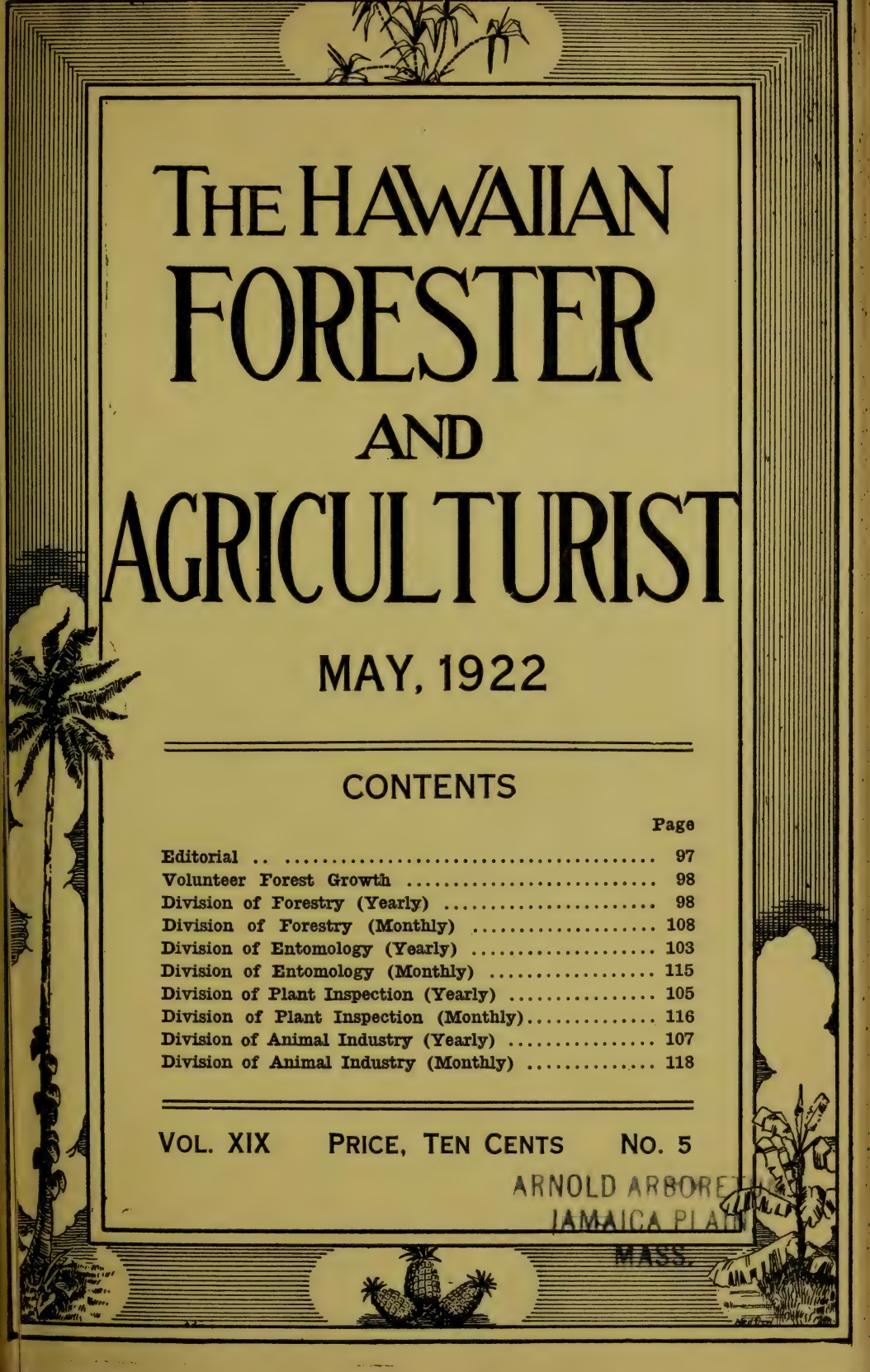
A. L. C. ATKINSON,
President.

Approved this 30th day of March, 1922.

Honolulu, T. H.

W. R. FARRINGTON,
Governor of Hawaii.





THE HAWAIIAN FORESTER AND AGRICULTURIST

MAY, 1922

CONTENTS

	Page
Editorial ..	97
Volunteer Forest Growth	98
Division of Forestry (Yearly)	98
Division of Forestry (Monthly)	108
Division of Entomology (Yearly)	103
Division of Entomology (Monthly)	115
Division of Plant Inspection (Yearly)	105
Division of Plant Inspection (Monthly)	116
Division of Animal Industry (Yearly)	107
Division of Animal Industry (Monthly)	118

VOL. XIX

PRICE, TEN CENTS

NO. 5

ARNOLD ARBORETUM
JAMAICA PLAIN

MASS.

The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy ; \$1.00 a year ; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*
J. M. Dowsett, W. M. Giffard,
H. M. von Holt, A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*
Charles J. Kraebel, *Assistant Superintendent of Forestry.*
David Haughs, *Forest Nurseryman.*
Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*
Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*
David Kapihe, *Forest Ranger for Tantalus, Oahu.*
E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*
J. P. Pico, *Forest Ranger for Waialeale Reserve, Oahu.*
Hosea K. Lovell, *Forest Ranger for Kauai.*
A. J. W. Mackenzie, *Forest Ranger for Hawaii.*
James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*
Antone P. Peralto, *Forest Ranger for Panaewa Reserve, Hawaii.*
Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*
H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*
Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*
V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*
Quan Chew, *Laboratory Assistant.*
Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*
L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*
Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*
E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*
Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai.*
G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*
Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*
Lloyd E. Case, *Assistant Territorial Veterinarian.*
H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*
A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*
Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*
Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*
Miss K. O'Dowda, *Librarian and Stenographer.*
Miss Helen Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX.

HONOLULU, MAY, 1922.

No. 5

During March 550 chaulmoogra trees were added to the oil producing plantation in the Waiahole Forest Reserve, Oahu.

During 1921, 107 wild goats, 9 wild cattle, 191 wild pigs, and 21 wild cats were killed on forest reserve lands.

Recent planting in the Pupukea Forest Reserve on Oahu in cooperation with pineapple growers has resulted in the setting out of 5,310 koa trees.

The Territorial Veterinarian points out that 95 per cent of the swine troubles in Hawaii is due to lack of proper sanitation.

The outcome of the proposed drive of 10,000 wild goats on the Puuwaawaa Ranch on Hawaii in June is awaited with interest.

During the year 1921 the amount of forest reserve boundary fencing was six times greater than in the previous year and a total of 28.98 miles received attention.

The annual reports of the superintendents of the four divisions of the Board for the calendar year 1921 are printed in this number and show the work that has been done during the past year.

The Superintendent of Forestry has recently sent a sample shipment of golden shower pods to a wholesale drug firm in San Francisco to determine the medicinal value of this article which now goes to waste in Honolulu.

The Division of Forestry planted out during the calendar year 1921, on eleven different forest reserves on the four main islands, a total of 44,261 trees of 33 different species. The total number planted by all throughout the Territory amounted to 383,458 trees.

VOLUNTEER FOREST GROWTH

BY H. B. PENHALLOW

At an elevation of about nine hundred feet and below a windbreak of Swamp Mahogany (*Eucalyptus robusta*) and Ironwood (*Casuarina equisetifolia*), planted about twelve years ago by the Wailuku Sugar Company along the south side of Waikapu Valley, Maui, a volunteer growth of seedlings of the above trees is making a promising showing.

These have started on a badly-eroded *pali* which is exposed to a strong, cool wind and subject to heavy wash from rains which probably is responsible for the spread of the seed but hardly the best conditions for fostering the growth of young trees.

The Ironwoods are the more numerous and the parent trees of this species in the windbreak have made the more vigorous growth, but the seedling Swamp Mahoganys evidently started first as they are the largest of the young trees.

The illustration accompanying this article shows the rugged character of the land and some of the young seedlings which will give an indication of the conditions under which they have grown and the possibilities of reforestation with these species on eroded mountain sides.

Trees of the same species which have been set out on similar locations on this plantation and elsewhere are also doing well. The feature of volunteering in poor soil under apparently adverse conditions makes them of particular value.

DIVISION OF FORESTRY

ANNUAL REPORT FOR CALENDAR YEAR 1921

Honolulu, Hawaii, May 4, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen: I respectfully submit the following brief report on the work of the Division of Forestry for the calendar year 1921:

INTRODUCTION

It is a pleasure to note that considerable progress was made during the year in forest protection and forest extension, the two main activities of this Division. In the work of fencing forest reserve boundaries there was an advance of more than six times the amount of fencing done during the previous year and more trees were planted in a larger number of forest reserves on the four main islands.

FOREST RESERVES

There were no changes in forest reserve areas during the year with the exception of five acres which were withdrawn from the Honolulu Watershed Forest Reserve on June 28, 1921, at the request of the Commissioner of Public Lands so that the land could be used for public purposes. In the 47 forest reserves throughout the islands there are now



Photo by H. B. Penhallow.

Volunteer Ironwood and Swamp Mahogany
Waikapu Valley, Maui.

817,109 acres, of which 557,339 acres or 68% is owned outright by the Territory.

Examinations and surveys were begun during the last half of the year which when completed and the proclamations are signed will add approximately 35,000 acres of government lands to the present total area and bring the number of reserves up to fifty.

FIELD FORCE

The care and administration of these reserves is in the hands of twelve forest rangers, two new rangers having been added to the force during the latter part of the year by the appointment of L. L. Peralto on October 1, and the appointment as honorary ranger of L. W. Bryan on November 9, 1921. On the basis of the total acreage of government lands in the reserves each of these rangers has to take care of 46,445 acres.

FOREST FENCING

It is well known that the native forest requires absolute protection for a healthy existence and for this reason the chief work of protecting it lies in the construction of fences to keep out stock.

During the year much more was accomplished than previously in the building and repairing of necessary fences on reserve boundaries not only by our own efforts but by cooperation with adjacent owners and requirements in general leases. In this manner a total of 12.00 miles of boundaries were newly fenced and 16.98 miles of fences were repaired, making a total of 28.98 miles receiving attention during the year on the four main islands as shown in the following table:

NEW FENCES IN 1921

Completed	Island	Reserve	Length in Miles
February	Oahu	Honolulu Watershed .....	.09
March	Hawaii	Honuaula	1.60
June	Hawaii	Olaa Forest Park	2.52
June	Maui	Koolau ..	1.96
July	Maui	Kula ..	.71
July	Kauai	Lihue-Koloa ..	.33
September	Hawaii	Olaa Forest Park .....	.56
October	Oahu	Waiahole ..	.89
October	Hawaii	Olaa ..	.82
November	Hawaii	Hilo ..	1.79
December	Hawaii	Hilo ..	.73
			<hr/> 12.00

FENCES REPAIRED IN 1921

January	Oahu	Waianae-kai ..	.94
January	Oahu	Kuliouou ..	.06
March-May	Oahu	Lualalei ..	1.24
March	Oahu	Hauula ..	.28
June	Hawaii	Koolau ..	.59
March-July	Oahu	Makua-Keaau ..	.17
Feb.-Nov.	Hawaii	Olaa Forest Park, Sec. C. .	5.44
March-Oct.	Hawaii	Olaa Forest Park, Sec. A ..	7.24
Jan.-Dec.	Kauai	Kealia and Moloaa	1.02
			<hr/> 16.98
Grand Total ..			<hr/> <hr/> 28.98

WILD STOCK

On certain reserves where conditions allow it with safety, permits are granted to hunt destructive wild animals in the forest reserves. Incomplete reports which have reached this office show that 107 wild goats, 9 wild cattle, 191 wild pigs and 21 wild cats were killed in this manner. The hunting of birds in the reserves is strictly prohibited in accordance with the policy, established two years ago, of treating the reserves as sanctuaries where wild birds may multiply unmolested.

FOREST FIRES

The force of volunteer district fire wardens has been kept full by new appointments as vacancies have occurred. These gentlemen have reported the following fires during the year:

February 21. Waioli, Halelea Forest Reserve, Kauai.

A fire started to burn off dead grass on an adjacent pasture land, jumped the line and burned over one acre of forest but was promptly extinguished.

March 7. Wahiawa, Oahu. A fire of unknown origin started on the ridge between the Poamoho and north fork of Kaukonahua Streams but was extinguished the same day by hired laborers working under Fire Warden Wilson. Approximately 50 acres were burned over, 75 per cent of which was covered with trees and ferns and the balance with Hilo grass.

March 13 to 17. Punahoa 2 and Piihonua, Hawaii. A fire started from burning over pasture land in Kaumana spread and burned over 150 acres of grass land and new tree growth on the 1881 flow before it was extinguished by hired labor on March 17. The individual negligently starting the fire was brought to justice and given a suspended sentence of 13 months.

June 6. Umauma, Hawaii. A fire started from the careless burning of sugar cane trash spread to the adjacent forest and damaged a scattered stand of trees on 15 acres. It was under control the same day and the guilty party was arrested and forfeited his bail in the sum of \$100 when he failed to appear in court.

June 21. Honokawai, Maui. A recurrent fire, started from unknown causes, burned over 350 acres of scrub-forest before it was finally extinguished five days later.

July 21. Waianae-uka, Oahu. A fire started from unknown causes burned over an area of grassland on Maili Ridge before it was extinguished the same day. On the following day there was a recurrence of the fire which was put under control that night. The fires of the two days burned over about 100 acres, of which 90 per cent was grassland and the balance forest.

August 9. Waianae-uke, Oahu. A fire started as a result of artillery practice burned over 30 acres of grassland on Maili Hill but was extinguished the same day.

August 10. Kapapala, Hawaii. A small fire was discovered in a thicket of pukeawe, surrounded by a lava flow. It was made safe by scraping a fire line around it and in a few days it went out.

August 17. Waioli, Kauai. A small fire reported to have been started in connection with the illicit distilling of liquor burned over two acres of forest but was extinguished by showers that night.

August 31. Waianae-uka, Oahu. Another fire started from causes unknown burned over seven acres of grass on Maili Hill and was extinguished the same day by the army.

Owing to dry conditions on the eastern side of Hawaii, the provision of the forest fire law requiring a permit before any burning could be done was put into effect on May 1, 1921, for the region from Waipio Valley to Kau.

TREE NURSERIES

The five general nurseries of the Division have been in active operation and have functioned well as propagators and distributors of forest, ornamental and shade trees throughout the Territory. The nursery at Kalaheo, Kauai, has been moved to a new location and refitted and the Hilo, Hawaii, and Haiku, Maui, nurseries have each been equipped with steam soil sterilizers which have already produced economical results.

TREE DISTRIBUTION

The number of trees distributed from these five main nurseries during the past year was as follows:

Trees Distributed From Nurseries in 1921

Oahu	Seedlings	Transplants	Pot grown	Total
Sold ..	.....	1,700	3,045	4,745
Gratis				
Arbor Day .....	.....	.....	5,028	5,028
Forest Reserves	13,700	17,080	5,761	36,541
Homesteaders ..	500	100	60	660
Military Posts .....	.....	1,050	7,608	8,658
Schools ..	.....	.....	17	17
Street Planting .....	.....	.....	12	12
Miscellaneous ..	6,900	7,400	1,587	15,887
	<u>21,100</u>	<u>27,330</u>	<u>23,118</u>	<u>71,548</u>
Kauai				
Kalaheo Nursery	8,000	.. ..	17,696	25,696
Maui				
Haiku Nursery	49,400	15,368	1,611	66,379
Hawaii				
Hilo Nursery	21,000	21,901	3,685	46,586
	<u>99,500</u>	<u>64,599</u>	<u>46,110</u>	<u>210,209</u>

The total number of trees distributed for planting on Arbor Day, which was celebrated on November 18, 1921, amounted to 6,384 seedlings.

TREE PLANTING ON FOREST RESERVES

The year showed greater activities in planting trees on government lands in forest reserves and 5,268 more trees were set out than during 1920. These included 33 different species planted mainly for the purpose of reestablishing a forest cover and scattered over eleven different reserves on the four main islands as follows: 1. **Kauai:** Papāpaholahola and Kalaheo. 2. **Oahu:** Pupukea, Keanu, Mikilua, Makiki, Waiahole and Kulionou. 3. **Maui:** Pelipoli Spring in Kula. 4. **Hawaii:** Hilo and Olaa.

Trees Planted in Forest Reserves in 1921

Koa (<i>Acacia koa</i>)	12,449
Ironbark (<i>Eucalyptus crebra</i>)	7,001
Red gum (<i>Eucalyptus rostrata</i>)	5,778
Logwood (<i>Haematoxylum campechianum</i>)	2,687

Swamp mahogany (<i>Eucalyptus robusta</i>)	2,543
Benguet pine (<i>Pinus insularis</i>)	2,250
Australian red cedar (<i>Cedrela australis</i>)	2,150
Lemon gum (<i>Eucalyptus citriodora</i>)	1,761
Silk oak (<i>Grevillea robusta</i>)	1,404
Cook pine (<i>Araucaria Cookii</i>)	1,089
Moreton Bay fig (<i>Ficus macrophylla</i>)	1,025
Flame tree (<i>Brachychiton acerifolium</i>)	986
Chaulmoogra (<i>Hydnocarpus anthelminticus</i>)	880
Mahogany (<i>Swietenia mahogani</i>)	681
Queensland nut (<i>Macadamia ternifolia</i>)	272
Japanese cedar (<i>Cryptomeria Japonica</i>)	219
Red mahogany (<i>Eucalyptus resinifera</i>)	192
Juniper (<i>Juniperus Bermudiana</i>)	189
Ironwood (<i>Casuarina quadrivalvis</i>)	154
Kauri pine (<i>Agathis australis</i>)	146
African tulip (<i>Spathodea campanulata</i>)	128
Allspice (<i>Pimenta officinalis</i>)	87
Lime (<i>Citrus medica acida</i>)	52
Uhiuhi (<i>Mezoneurum Kauaiense</i>)	35
Chaulmoogra (<i>Taraktogenos Kurzii</i>)	35
Black myrobalan (<i>Terminalia chebula</i>)	25
Chaulmoogra (<i>Hydnocarpus castanea</i>)	4
Miscellaneous species ..	39
Total ..	44,261

GENERAL TREE PLANTING

Reports on trees planted throughout the Territory, which are probably not as complete as they should be, show that during the year a total 383,458 trees were planted out on all of the islands with the exception of Niihau. These plantings were distributed as follows

Kauai ..	50,055
Oahu ..	81,579
Molokai ..	550
Lanai ..	3,000
Kahoolawe ..	3,800
Maui ..	140,794
Hawaii ..	103,680
Total ..	383,458

CHAULMOOGRA OIL TREE PLANTATION

Of special interest is the plantation of three different species of chaulmoogra oil trees, started from seed secured by Mr. J. F. Rock in Burma, which is being established in the Waiahole Forest Reserve, Oahu, with the object of supplying the needs of the Territory for chaulmoogra oil. The planting of the 3,000 trees available for this purpose was begun in December and when completed the plantation will cover 28 acres. It will be approximately ten years before the trees will begin to bear the fruit producing the seeds from which the valuable oil is expressed.

MISCELLANEOUS

A suggestion has been made to the regents of the University of Hawaii that sufficient courses in forestry be offered to prepare young citizens of the Territory for the position of forest ranger for which there is need of a considerable number in the work on forest reserves as soon as sufficient appropriations are made for the purpose.

In March an experiment was started in Nuuanu Valley to determine whether Hilo grass may be overcome through the shading out of a stand of haole koa (*Leucaena glauca*) trees established by broadcast sowing.

The Division participated in the Fourth Maui County Fair held at Kahului on October 13 to 15, 1921, by exhibits of trees, seeds, wood specimens, photographs of forest activities, working erosion model, and boughs of temperate zone coniferous trees such as spruce, pine, and cedar grown at 7,000 feet elevation on Haleakala.

Initial steps were taken for giving better protection to the delicate native forest on the city watershed in Palolo and Manoa Valleys by the preparation of Rule V which has already received your consideration and approval.

Respectfully submitted,

C. S. JUDD,

Superintendent of Forestry and Chief Fire Warden.

DIVISION OF ENTOMOLOGY

ANNUAL REPORT FOR CALENDAR YEAR 1921

January 30, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I am pleased to report as follows on the activities of the Division of Entomology in the annual period January 1 to December 31, 1921.

The propagation and distribution of beneficial insects, particularly the fruit fly, hornfly, and corn leaf hopper parasites have been continued throughout the year and a tabulation below gives the numbers of the different species liberated, according to islands, and references to place of liberation.

The routine work of advising in regard to agricultural and stock pests and their control, the maintenance of the insect collections, etc., has also been faithfully performed.

Three major projects however have engaged most of the time and attention of the Division, namely, 1. The investigation of the possibilities connected with the introduction and colonization of the capri-fying insects associated with the various species of fig trees (*Ficus spp.*) growing in Hawaii, as an aid to forestry; 2. The search for and introduction and colonization of various insects likely to aid in the control of the hornfly; 3. A study of the insects infesting the pineapple plant, with regard particularly to the possibility in controlling the most injurious species by natural and artificial agencies.

The fig insect investigations were undertaken in cooperation with the botanist and entomologists of the Hawaiian Sugar Planters' Association and included in their scope seven species of figs native to the Oriental region namely *Ficus retusa*, *infectoria*, *hispida*, *rumphii*, *benjamina*, *bengalensis* and *elastica*. In the prosecution of these investigations the entomologist visited Japan, the Philippine Islands, Hong Kong, Singapore and Penang on the Malay Peninsula, and various parts of British India, studying the character of the trees and the relation of the capri-fying insects to them, the periodicity of the insects and problems of transportation. The insects associated with each species were collected for study and numerous shipments of figs containing living fig wasps were made from Hong Kong. Where ripe figs were not obtainable arrangements were made to have them sent in season. A full report of this investigation appeared in the June Forester.

The work done on hornfly control embraced an investigation of the natural agencies limiting the abundance of dung flies in Australia by Mr. J. F. Illingworth, formerly Professor of Entomology at the University of Hawaii and more recently Government Sugar Entomologist in Queensland, and in Southwest United States and Mexico by Mr. Herbert T. Osborn, Assistant Entomologist at the H. S. P. A. Experiment Station. On the basis of these investigations shipments were made of the most promising species of parasites, predators and scavengers which have been released in suitable localities on Oahu, Hawaii and Maui. Four consignments were received from Mr. Illingworth, six from Mr. Osborn, consisting for the most part of various species of dung rollers or tumblebugs (*Copriid* beetles). More stress has been put upon establishing coprophagous agents than upon parasites because it is believed the destruction of the dung is the most important element of the problem at the present time. If the number of flies could be reduced fifty per cent by destroying their breeding places, the action of parasites and predators would soon be appreciated. A detailed report on the progress of this work up to the middle of November appeared in the October Forester. Since then two additional consignments of material have been received from Mr. Osborn.

The pineapple insect investigations had their origin in an outbreak of fruit beetles at the time of harvesting the crop and have been continued since that trouble disappeared, on account of the appearance of red spider in the fields on the island of Oahu. Control methods are being studied not only for the red-spider but also for the mealybug and scale which are believed to be responsible to some extent for the outbreak of the fruit beetle and heart rot.

A parasite of the fern weevil, discovered by Mr. Pemberton in Australia, has been introduced and established in these islands and promises to furnish an effective control upon the weevil which threatened the destruction of part of the ground cover in our forests. The introduction was noted in the July Forester.

Assistance was given to the Federal Entomologist in Hawaii in introducing and colonizing additional parasites of the bean weevils. A detailed account of this work appears in the September Forester, and it is gratifying to be able to report the establishment of at least one of these parasites already. The establishment of one of the pupal parasites of the fruit fly introduced by Dr. Silvestri in 1914 is also noted.

The publications from this office during the year, in addition to those already referred to, have been—

The Fern Weevil (*Syagrus fulvitaris* Pasc.)

Hawaiian Forester, V. XVIII. 5, pp. 101-114, Pl. 1. May.

Notes on Immigrant Coleoptera (in the press). Also, a paper on the Insect Problems of the Pineapple Industry was prepared and read at the Annual Conference of Field Workers held by the Hawaiian Pineapple Growers' Association, November 17, 18 and 19.

Respectfully submitted,

D. T. FULLAWAY,

Entomologist.

TABULATION SHOWING THE LIBERATION OF BENEFICIAL INSECTS 1921

	Oahu	Kauai	Molokai	Maui	Hawaii	Total
Fruit fly Parasites*						
<i>Galesus silvestri</i>	6,550	.....	.....	350	.....	6,900
<i>Diachasma tryoni</i>	12,322	.....	300	700	.....	13,322
<i>Tetrastichus giffardianus</i>	22,250	.....	500	1,900	.....	24,650

Dirhinus giffardi	6,050	....	....	250	....	6,300
Opits humilis	3,480	....	200	100	....	3,780
Diachasma fullawayi	9,610	....	300	540	....	10,450
Total.....	60,262	....	1,300	3,840	....	65,402

Melon fly Parasites†

Opius fletcheri	37,700	800	1,725	1,200	41,425
-----------------------	--------	-----	------	-------	-------	--------

Corn leaf hopper Parasites‡

Paranagrus osborua	1,000	2,400	3,400
--------------------------	-------	------	------	------	-------	-------

*Liberated at: **Oahu.** Honolulu, Pearl City, Maunawai, Waipahu;
Maui. Wailuku, Kula, Paia.

†Liberated at: **Oahu.** Honolulu, Pearl city, Wahiawa, Waianae; **Maui.**
Kihei, Makawoa; **Hawaii.** Kamuela, Keaau;
Kauai. Kealia, Lihue.

‡Liberated at: **Oahu.** Honolulu; **Hawaii.** Waiohinu, Keaau, Kohola.

DIVISION OF PLANT INSPECTION

ANNUAL REPORT FOR CALENDAR YEAR 1921

December 31, 1921.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I herewith submit for your kind consideration a brief report covering the activities of the Division of Plant Inspection during the calendar year 1921.

The work performed by the Staff consisted of the usual work attendant on inspection of plants and plant products from outside this Territory as well as the inspection of domestic produce for inter island shipments.

The staff of the office consisted of the same personnel as reported on December 31, 1920.

EQUIPMENT

The equipment remains the same as last year except for a few small improvements. We have added a safety door or screened entrance to the quarantine room. This was found necessary as we found from experience that some shipments of seeds and plants arriving in cases, when opened, had insects on the wing ready to escape. With the safety door all such escapes cannot reach the open and the whole quarantine room can be tightly closed and fumigated. We have also equipped a small developing room out of one of the old fumigating units which we had on Pier No. 10. We find it very useful and a good addition to our plant as it enables us to photograph many interesting captures thus adding valuable collections not only in specimens but in photos which exemplify the important work we are doing.

HILO PLANT FUMIGATION BUILDING

On September 1, the fumigation unit which was to have been built at Hilo in 1920, was completed. It consists of a concrete fumigation vault, 20 x 20 floor space and 10 feet ceiling height, a 10 x 10 foot office of T. and G. lumber and a 10 x 10 shed in the rear office under which is stored a 6 x 8 x 8 fumigating box and which will be used for small infested shipments as in the past. Into the large concrete vault can be placed from 1600 to 1800 bags of rice or other cereals. This Division is now in a position to handle any infested shipments arriving at Hilo and will give greater protection to the big island.

WORK PERFORMED

During the year we inspected 712 vessels arriving at the ports of Honolulu, Hilo and Kahului. Of these 388 vessels carried vegetable matter consisting of 23,845 lots and 480,610 packages, of the following:

Fruits and vegetables	477,292
Seeds of various kinds	2,755
Plants, bulbs and roots	563

Total ..	480,610
----------	---------

From all these shipments 729 packages were seized and destroyed by burning having been found infested with serious pests; 203 packages were fumigated either as a precaution or as being infested with minor pests already here; and 397 packages were refused entry, returned to the vessels on account of being infested with pests or diseases or being contraband under rulings of the Federal Horticultural Board of Washington, D. C.

RICE AND BEAN SHIPMENTS

During 1921 we inspected 217,568 bags of rice and 36,649 bags of beans arriving through the ports of Honolulu and Hilo direct from Oriental ports. All these shipments were found free from pests of any kind and all shipments were accompanied by certificates issued by government officials which has been in vogue for several years and by which we have been able to check the indiscriminate shipments of old and badly infested materials.

BAGGAGE DECLARATION UNDER FEDERAL RULE

On October 1, the regulations for the carrying out of Notice of Quarantine No. 51 took effect. On account of not receiving the necessary blanks for making declarations from Washington, we were unable to start this work until November 8. All coastwise vessels carrying passengers are now boarded at Quarantine anchorage and all vessels have been furnished with the necessary blanks for baggage declaration. A complete record is being kept of all declarations made and what they consist of. So far we have had very little trouble in carrying out the regulation as all the agencies have cooperated in a business-like manner.

INTER ISLAND INSPECTION

The work of inspecting horticultural products shipped from Honolulu to ports on the other Islands has continued on the same lines as in preceding years. Especial importance was given to all plant shipments to see that no soil was attached to their roots, also that the shipment of ferns and other plants prohibited in inter-island traffic was prevented from leaving Oahu. A total of 643 steamers plying between Honolulu and ports of the other islands were attended during the year and 23,960 packages of plants, fruit, vegetables and sugar cane were inspected. Of this number 393 packages were rejected either because of infestation or through non-compliance with the various regulations of the Board.

PESTS INTERCEPTED

During the year 1921 a large number of injurious insects and plant diseases were intercepted in the course of inspection. Our records show that we made 157 captures on materials arriving from the mainland of the United States and from foreign countries. Among these are some very injurious pests which would become a great menace to our agricultural industries had they been allowed to enter the Territory.

FEDERAL HORTICULTURAL BOARD

The Federal Horticultural Board of Washington, D. C. of which we are Collaborators, passed four Notices of Quarantine with regulations during the year. No. 49 prohibits the importation or entry into the United States of all fruits and vegetables in the raw or unprocessed state and materials of plants and portions of plants used as packing for such shipments on account of the Citrus Blackfly (*Aleurocanthus woglumi*), from Cuba, the Bahamas, Jamaica, Canal Zone, Costa Rica, India, Philippine Islands, Ceylon and Java. This is a very serious pest of a number of fruits and plants in those countries and with this regulation another good step is taken to prevent its introduction into the United States and Territories. No. 50 prohibits the movement of various bean varieties and cowpeas in the green state as well as forms of greens and edible plant leaves such as mustard, chard, etc., also hay and other forage crops from the State of Alabama into the other states of the Union on account of the Mexican Bean weevil (*Epilachna corrupta*), which has made its appearance in that state and which is a serious pest to such crops. No. 51 prohibits the movements of sugar cane, corn, cotton and alfalfa, the fruits of avocado and papaya from the mainland of the United States to Hawaii and was promulgated at the request of the Commissioner of Agriculture and Forestry and has been in force since October 1st, 1921.

No. 52 quarantines the states of Texas, Louisiana and New Mexico on account of the cotton bollworm which has made its appearance in these states during the latter part of 1921. It regulates all traffic of cotton and cotton products as well as carriers used for transportation of such materials. This pest is already here in these islands, and other regulations prevent cotton and cotton products from being shipped from here to the mainland.

Respectfully submitted,

E. M. EHRHORN,
Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

ANNUAL REPORT FOR CALENDAR YEAR 1921

March 1, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: It may be said that the past year has been favorable to the continued advancement of the animal industry of the Territory. Every branch of the live stock industry has felt the impress of new blood, represented in the increasing importations of high-class breeding stock which have been coming steadily from the mainland for the past few years. As an indication of what is being done along the lines of breeding pure-bred cattle, it may be stated that this Territory can boast the largest herd of pure-bred Hereford cattle in the United States.

With the exception of hemorrhagic septicemia, the live stock industry has suffered little from disease or from adverse climatic conditions. The swine industry has probably suffered the greatest loss from the above-mentioned disease.

As in the past, the eradication of bovine tuberculosis has constituted the main work of this Division, although during the latter part of the year a considerable amount of time was spent in controlling outbreaks of hemorrhagic septicemia in both cattle and swine, particularly in the latter class of animal. A slight decrease in the amount of tuberculosis occurring in the entire Territory has been noted during the past year. Certain heavily-infected districts on this island showed up with fewer

condemned animals than at any time since systematic testing first started. All indications point to a considerable reduction in the amount of infection during the coming year.

No authentic case of anthrax has occurred in the Territory during the past year; in fact, the last death from this disease was reported almost three years ago. In a short time we hope to be able to report anthrax as definitely eradicated from the Territory.

No case of glanders and only one case of epizootic lymphangitis has come to notice during the past year. It is, however, probable that sporadic cases of glanders may be reported from the Kohala District.

Outbreaks of hemorrhagic septicemia in both cattle and swine have occurred in various parts of the Territory and have for the most part, when properly reported, been controlled through vaccination with nominal loss. With this disease in swine, however, vaccination has not been uniformly successful, due principally to an almost general lack of attention to the proper housing, diet, and sanitary conditions surrounding the animals. These are factors which must be given careful consideration if efforts at the control and eradication of swine diseases are to be effective.

Of considerable importance to the poultry industry has been the manufacture of a vaccine and a bacterin for sore-head by a new process which enables the Division to keep on hand large amounts of these biologics for the control and cure of this disease of poultry. So far as we have been able to learn, experiments carried on with these biologics have been successful in every case.

Livestock importations have increased somewhat during the past year. Interest centers mainly in the cattle, a total of 628 head being imported. The dairy breeds constituted the bulk of the importations, Holsteins predominating. Many of the shipments were of the highest class, champion and grand champion stock.

A number of shipments of high-grade dairy cows have been brought down to supply a growing demand of the dairymen for medium priced high-producing cows. The dairy industry still remains confined to the production of the fresh milk necessary to supply the demands of the public, while practically all other dairy products are imported.

Respectfully submitted,

LEONARD N. CASE,
Territorial Veterinarian.

DIVISION OF FORESTRY

REPORT OF THE SUPERINTENDENT OF FORESTRY MARCH, 1922

April 20, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of March, 1922:

FOREST PLANTING

Reforestation work during March resulted in the planting out of 4,933 trees on five different reserves situated on Kauai, Oahu, and Hawaii as follows:

Kauai: Kealia Forest Reserve at Anahola—Lemon gum.....	232
Oahu: Honolulu Watershed Reserve at Makiki—Koa.....	278
Lualualei Forest Watershed at Mikilua—Logwood.....	2,699
Waiahole Forest Reserve at Waiahole,—Moreton Bay fig...	100
Koa	770
Manele (Soapberry)	100
Chaulmoogra (<i>Hydnocarpus anthelminticus</i>).....	550
Hawaii: Hilo Forest Reserve, Laupahoehoe—Lemon gum.....	204

Total number of trees planted.....4,933

PEJIBAYE PALM SEED

From the Bureau of Plant Industry during February we received 200 seeds of the Costa Rican palm peji-baye (*Guiljelma utilis*), which produces edible seeds, and on March 22 an additional lot of 500 seeds was received. From the latter shipment a quantity was sent to each of the other three nurseries for propagation. As yet none of the seed sown in the Government Nursery in Honolulu has germinated.

PLANTING AT PUPUKEA AND MIKILUA

Inspections were made during the month of the plantings at Pupukea and Mikilua. At the first place the planting operations for the year under co-operative agreement have been completed with the setting out of 5,310 koa trees. These have been given a fine start by the favorable moisture conditions which obtained there. The recent rains at Mikilua have also helped the trees considerably and the logwood and some of the banyans and Norfolk Island pines are doing very well in this comparatively dry section.

AIRPLANE SEED-SOWING

In connection with the project of the H. S. P. A. to sow seed of the Moreton Bay fig over parts of the west slope of the Koolau Range, on Oahu, from army airplanes, I was called into consultation, and advised the restriction of such sowing to eroded areas and to regions where the native forest was depleted and in need of building up, and not to sow any seed over areas where the fully-stocked indigenous forest in good condition was functioning satisfactorily as a conserver of water.

TI LEAF PLANTATION

In view of the abolition of permits to gather ti leaves in any part of the Honolulu Watershed Reserve and the frequent requests received from Hawaiians and others for this material for use at luaus, I have instructed the Forest Nurseryman to start a small ti leaf plantation in an accessible place in one of the Makiki valleys, so that the material may be supplied in the future without detriment to the forest cover.

GOLDEN SHOWER PODS

Some time ago my attention was called to the fact that on the mainland the raw pods of the golden shower (*Cassia fistula*) were sold at drug stores as a laxative for \$1.00 per pound. In the effort to ascertain the quality of the pods grown here, and to find a market for the large quantity which annually goes to waste, I made a selected shipment of golden shower pods just ripening on March 21, to Nature's Herb Company in San Francisco. Their report on the quality and price which they will pay are awaited with interest.

OLONA CUTTINGS

At the request of the Director of the Bureau of Forestry in Manila, I forwarded to him on March 14, a quantity of cuttings of the Hawaiian fiber plant olona (*Toucardia latifolia*). The Bureau there is very eager to establish this valuable fiber plant in the Philippine Islands.

RECLAIMING GRASSLAND

On March 18 an examination was made of the plots in Nuuanu Valley where an experiment was begun a year ago to determine whether Hilo grass may be shaded out by haole koa trees (*Leucaena glauca*) established by broadcast sowing under various conditions. The results are not promising, for the number of seedlings had dropped off more than 50 per cent from what they were six months previously, owing to the

very rapid and rank growth of the grass. The experiment will be kept under observation for another two years, however, in the hope that the remaining seedlings will eventually overtop the grass.

FOREST FENCING

Owing to the heavy rains very little progress was made during the month in fence construction on forest reserve boundaries. On Hawaii only .08 mile of new fences was constructed and .22 mile of old fences repaired, but preparations were made for more extensive fencing as soon as weather conditions permit by the shipping of wire and cutting of posts. Progress was made in the Mokuleia fencing project by enlisting the co-operative aid of the Dillingham interests, which have agreed to stand one-half the cost of the fence. Mr. J. P. Mendonca is yet to be heard from on this project before field work can begin. In preparation for fencing the Kuaokala Forest Reserve eight standard monuments were set on March 10 at prominent points on the boundary of this reserve, which is situated at the west end of the Waianae range of mountains.

RULE V.

Two days were spent in making observations on the way to Konahua-nui, within the area proposed to be closed to trampers by Rule V., and in investigating the use of surface waters by residents in upper Manoa Valley in preparation of a further report to you on the subject. Material assistance has also been rendered by Mr. S. W. Tay and Dr. H. L. Lyon in supplying technical information on certain phases of this important question.

KOKEE CAMPS

Letters were sent to several of the holders of permits for camps at Kokee, Kauai, instructing them to perfect certain sanitary arrangements in order to comply with the Board of Health regulations. Six of the permits have also been cancelled because of failure to comply with clauses in the permit relating to improvements and residence or for non-payment of the annual fee.

GOAT DRIVE

Senator Robert Hind has appealed to me for assistance in ridding the Government lands at Puwaawaa, under lease to him, of the scourge of wild goats, which are eating up his best pastures. He claims that unless a complete drive is made soon of the estimated number of 10,000 wild goats on the land, his stock business will be ruined. I am planning to ask the next Legislature for an appropriation to employ professional hunters to work on the goats on Hawaii, but Mr. Hind wants more immediate relief. He would like to assemble 300 persons at Puwaawaa in July and make a goat drive as complete as possible. I have taken up the matter with the Boy Scout officials, but they have no funds to finance the sending of scouts up to Kona for this purpose, and we have no appropriation which could be used in this work.

Respectfully submitted,

C. S. JUDD,

Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY MARCH, 1922

April 20, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following statement of my activities during March, 1922, is respectfully submitted:

The entire month was spent on the island of Oahu, about one-third of the time being taken up by work in the field and the remainder in the Honolulu office.

PUPUKEA

Two days were spent with the Superintendent and Ranger Ellis on a field trip to the north end of the island. On March 9 we inspected the forest planting done in the Pupukea Forest Reserve by a pineapple grower, in return for the temporary use of land within the forest reserve. Of the several species planted, *Ficus retusa* and native koa made the best growth. A quantity of halapepe seed was gathered on this trip, and several sandalwood and ahakea logs found cut in trespass were confiscated.

KUAOKALA

On March 10 an unfenced portion of the Kuaokala Forest Reserve boundary was marked with standard boundary pipes, in order to indicate clearly to the lessee of adjacent Government lands where required fences are to be built. A great portion of this reserve has been illegally overrun by livestock for so many years that the native forest has been reduced to mere pockets of timber in the gulch bottoms and on inaccessible slopes. The ridge-tops and gentler slopes are covered with lantana and coarse grasses, while in many places serious erosion has occurred. To restore this treeless area to forest cover will now require extensive and costly planting and the lapse of many more years than were required to destroy the original forest.

The first need in this work of reforestation is the immediate expulsion of all stock and the construction of stockproof fences and barriers around the boundary. Until absolute protection is assured by the construction of such fences it will be useless to attempt planting of any sort.

MISCELLANEOUS FIELD WORK

On March 13 a trip was made with the Superintendent and Ranger Ellis to the summit of Konahuanui for the purpose of further observing the condition of the forest from the standpoint of Rule V of the Board, which orders the closing of this trail to trampers.

On March 18 an examination of the Hilo grass eradication experiment in Nuuanu Valley was made. Comparatively few *Leucaena glauca* seedlings were found, their number showing a heavy loss since the first examination six months ago. It is obvious that this loss was due to the continued vigorous growth of the Hilo grass, which is now so dense on the plots from which it was cleared and burned one year ago, that little difference can be detected between these plots and the adjacent area on which the grass was left undisturbed. The only hope of reasonable success is offered by the "cleared-and-plowed" plots on which a few *Leucaena* seedlings seem vigorous enough ultimately to overtop the grass.

On the same day intensive examination of the experimental plantation of eucalyptus on the Ewa side of Nuuanu Valley was begun.

Two and one-half days were spent on field work for a map of a portion of Round-Top Forest Reserve in the vicinity of the prison camp.

March 22 was spent at Kahuku, where, in company with interested parties, an examination was made of the country mauka of the cane and pineapple lands, with a view to the creation of a new forest reserve.

Grazing and pineapple cultivation have so encroached upon the forest in this region that there has resulted a serious diminution in the water supply to the cane lands below. The Kahuku Plantation Company is anxious to hasten the establishment and protection of this forest reserve, which was first proposed twelve years ago.

Each year of delay decreases the existing forest area and increases the time which will be required to restore the forest to its former effectiveness in water conservation. Some careful study in the field will have to be done in order to harmonize the several interests of ranch, pineapple grower, plantation company and owner of the land, before the forest reserve boundary can be drawn. In the meantime, however, much good can be done by the planting of forest trees in numerous barren places where protection from cattle can be assured. This work is being undertaken by the Forestry Division of the Planters' Experiment Station.

VISITORS

During the month several days were given to the entertainment of visiting foresters. Mr. Russell P. Luke, from the South Seas, interested in copra plantations, and Mr. Alexander Muzzall, forester with the Goodyear Rubber Plantations in Sumatra, each spent a day in Honolulu en route to the mainland. Later, Mr. Oscar Schaefer, another forester from Sumatra, also stopped off for a day.

On March 21, Mr. John D. Griffin, of Oregon, arrived at the instance of the Outdoor Circle to assume charge of the work of caring for the city shade trees. Some time was spent making Mr. Griffin acquainted with the shade and ornamental trees of the city and outlining the street tree problems peculiar to Honolulu.

Respectfully submitted,

C. J. KRAEBEL,
Asst. Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, MARCH, 1922

April 8, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: I herewith submit a report of the principal work done during the month of March:

NURSERY

DISTRIBUTION OF PLANTS

The number of plants distributed, including those sent to forest reserves, are as follows:

	Seed Boxes	Pot Grown	Total
Oahu—Sold	2,000	151	2,151
—Gratis	5,000	1,942	6,942
	<hr/> 7,000	<hr/> 2,093	<hr/> 9,093

SUB-NURSERIES

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Maui and Molokai.....	450	.....	450
Kauai	1,000	225	1,225

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Hawaii	9,000	900	....	9,900
	<u>9,000</u>	<u>2,350</u>	<u>225</u>	<u>11,575</u>
Total for all islands.....				20,668

COLLECTIONS

GOVERNMENT REALIZATIONS

Sale of plants, Government Nursery, Honolulu.....	\$ 5.30
Rent of Office, Nursery Grounds, for February.....	35.00
	<u>\$40.30</u>

PRESERVATION FOREST RESERVES

KOEKEE CAMPS, KAUAI

Rent of premises at halfway house, Tantalus, for quarter ending March 31, 1922	\$30.00
Permit fee for 1922, Kokee Camp Site No. 29.....	7.00
Permit fee for 1922, Kokee Camp Site No. 27.....	10.00
Permit fee for 1922, Kokee Camp Site No. 1.....	5.00
	<u>\$52.00</u>

BLACK SAND

171 loads of black sand, taken from Makiki Valley pit, at \$0.50 per load	\$ 85.50
--	----------

CORD WOOD

10 cords wood from Waiahole Forest Reserve at \$2.50.....	\$ 25.00
	<u>\$162.50</u>

ANIMAL INDUSTRY REVOLVING FUND

The following amounts were received for the sale of vaccines:

John P. Contrades.....	\$ 0.50
Eric H. Edwards	7.50
A. R. Rowat	16.00
Kualoa Ranch	10.00
Chas. Lucas	11.25
Izumi (Dr. Golding).....	12.00
	<u>\$57.25</u>

All of the above amounts were deposited with the Treasurer on March 31, 1922.

MAKIKI STATION

The work done at this station consisted principally of routine. We are increasing our stock and will have a large number of trees ready next planting season.

TREES PLANTED IN FOREST RESERVES

LUALUALEI, OAHU

Mr. J. K. Luka reports the following trees planted during March:	
Logwood	2,699

WAIAHOLE, OAHU

Mr. Alfred Rocha reports the following trees planted during March:

Koa	550
Hydnocarpus anthelminticus	770
Manele	100
Moreton Bay Fig	100

1,520

HONOLULU WATERSHED

Koa	278
-----------	-----

Total for Oahu.....4,497

In addition to the planting of the 278 koa trees, the men have been clearing land and rooting out pests on the Honolulu Watershed.

KAUAI

Mr. H. K. Lovell reports the following trees planted during March:

Lemon gum	232
-----------------	-----

Total number of trees planted on reserves.....4,729

PLANTATION COMPANIES AND CORPORATIONS, ETC.

Trees distributed during the month amounted to 3,100 assorted pot-grown plants.

ADVICE AND ASSISTANCE

The writer has, at the request of people in and around the city, made the following number of calls and otherwise given advice and assistance as follows:

Calls made	8
Advice given by telephone.....	6
Advice given people calling	10

Respectfully submitted,

DAVID HAUGHS,

Forest Nurseryman.

DIVISION OF ENTOMOLOGY

REPORT OF ENTOMOLOGIST, MARCH, 1922

April 11, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: During the month of March the insectary handled 6,500 pupae of the melon fly, from which there were bred 985 females and 975 males of *Opius fletcheri*.

MELON FLY PARASITES

Opius fletcheri

Oahu—Mr. M. Tamura, Waianae.....400 females, 350 males
Kauai—Mr. S. Miyasato, Kapaa.....350 females, 350 males

FRUIT FLY PARASITES

Diachasma Tryoni

Oahu—Mr. M. Kawahara, Kalihi, Honolulu.....110 females, 100 males

Opius Humilis

Oahu—Mr. M. Kawahara, Kalihi, Honolulu..... 30 females, 30 males

Diachasma Fullawayi

Oahu—Mr. M. Kawahara, Kalihi, Honolulu..... 50 females, 50 males

Tetrastichus Giffardianus

Oahu—Mr. M. Kawahara, Kalihi, Honolulu.....900 males and females

CORN LEAF HOPPER

Oahu—Kaneohe School800 males and females

The Entomologist's time during the month was occupied with spraying and dusting experiments and the investigation of pineapple insects. A journey was made to Hilo to participate in the demonstrations of spraying and dusting under the auspices of the University of Hawaii Extension Department, and the short course of the same department for pineapple workers held in Honolulu, March 27-April 1, was also attended and participated in.

Respectfully submitted,

D. T. FULLAWAY,

Entomologist.

DIVISION OF PLANT INSPECTION

REPORT OF THE CHIEF PLANT INSPECTOR FOR MARCH, 1922

March 31, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of March, 1922, as follows:

During the month we boarded 50 vessels, 19 of which carried vegetable matter and 10 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	1,160 lots	23,389 pkgs.
Fumigated	13 lots	13 pkgs.
Burned	82 lots	82 pkgs.
Returned	43 lots	43 pkgs.
Total inspected.....		1,298 lots
		23,527 pkgs.

Of these shipments 23,026 packages arrived as freight, 238 as baggage, and 263 as mail.

RICE AND BEAN SHIPMENTS

25,299 bags of rice and 654 bags of beans from the U. S., and 848 bags of rice and 2,700 bags of beans from Japan arrived, all clean.

PESTS INTERCEPTED

Approximately 4,405 pieces of baggage belonging to immigrants from foreign countries were examined, from which 62 lots of fruit and 40 lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than that above mentioned, follows:

From Australia:

Chionaspis citri on lemons, baggage.

From China:

Aphis on Caladiums, cargo.

Lepidosaphes sp. on pomelo, baggage.

From Japan:

Pseudaonidia trilobitiformis, *Parlatoria pergandii*, *Phomopsis citri* *Cladosporium citri* and *Hemichionaspis aspidistrac* on tangerines, baggage.

From the Philippines:

Pheidole sp. on seeds, baggage.

Weevils (undetermined) on betel nuts, mail.

PROHIBITED MATERIAL BURNED

Lemons, baggage from Australia.

Pomelo, baggage from China.

Mango seed, baggage from China.

Pine tree limbs, baggage from China.

Tangerines, baggage from Japan.

Two five-leaf pines, baggage from Japan.

Tree seeds, baggage from Japan.

Corn, mail from Japan.

Plant, mail from Japan.

Paddy rice, mail from the Philippines.

Taro, mail from Portugal.

MATERIAL FUMIGATED

Tree seeds, mail from Manila, precautionary.
 Vegetable seeds, mail from Manila, precautionary.
 Betal nuts, mail from Manila, infestation.
 Caladiums, cargo from China, infestation.

MATERIAL REFUSED ADMITTANCE AS CONTRABAND

Sandpears, baggage from Japan.
 Plant, baggage from Japan.
 Florida grapefruit, cargo from Seattle.

BENEFICIAL INSECTS

During the month three packages of beneficial insects were received from F. X. Williams, Manila, for the H. S. P. A. These were taken by me personally to the H. S. P. A. and passed in the usual manner.

HILO INSPECTION

Brother M. Newell, Inspector at Hilo, reports the arrival of 12 vessels with eight carrying vegetable matter, consisting of 207 lots and 2,696 parcels, all passed.

KAHULUI INSPECTION

Mr. L. Gillin, Inspector for Maui, reports the arrival of six vessels, with four carrying vegetable matter consisting of 25 lots and 559 parcels, all passed as free from pests.

INTER-ISLAND INSPECTION

Fifty-eight steamers plying between Honolulu and the other islands were attended and the following inspections made:

Passed—Taro, 173 bags; vegetables, 144 pkgs.; fruit, 213 pkgs.; plants, 172 pkgs.; seeds, 2 pkgs.; pine shoots, 1,300 bags; sugar cane, 103 cases. Total, 2,107 packages.

Rejected—Plants, 12 pkgs.

LOCAL FUMIGATION

During the month we fumigated the following for various merchants, etc.:

One lot books, two lots furniture, nine rugs, one screen.

Respectfully submitted,

E. M. EHRHORN,

Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

REPORT OF TERRITORIAL VETERINARIAN, MARCH, 1922

April 20, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I have the honor to submit the following report of the Division of Animal Industry for the month of March:

TUBERCULOSIS CONTROL

For the total number of animals tested and condemned during the past month, see the appended report of the Assistant Territorial Veterinarian.

The outstanding feature of the work has been the condemnation of six head of imported cattle at the quarantine station. These cattle all came from California herds, and two out of the six were pure-bred registered stock.

All of these cattle had passed a tuberculin test on the mainland shortly before being shipped to Hawaii. Three different tests were used, i. e., subcutaneous, opthalmic and intradermal (subcaudal fold method). All of them came from infected herds and had been exposed to infection for varying lengths of time. Two out of the six, the pure-breds, were shipped back to the Coast; the remaining four were slaughtered here. On autopsy ample evidence of active tuberculosis was revealed.

During the last few years the efficiency of our method of tuberculin testing and the protection afforded this Territory by our importation regulations, has been repeatedly demonstrated. In tuberculosis eradication this Territory leads the entire United States. Our indemnification laws and regulations are most liberal and efficient; our method of testing is the most universally applicable and of proven superiority over any other form of tuberculin test now being used.

SWINE DISEASES

No reports of outbreaks of swine disease have reached this office, with the one exception of a small outbreak of what Dr. Golding is pleased to call hog cholera, occurring in one of the Japanese camps on the Makaweli plantation.

Numerous inspections have been made at different piggeries at various points on this island, and no sick pigs have been met with. In almost every instance sanitation is conspicuous by its absence. The condition at present is hopeless and will remain so until control of the sanitary requirements surrounding the breeding, raising and keeping of hogs, the issuing of licenses, permits, etc., is placed where it belongs, in the hands of the Board of Commissioners of Agriculture and Forestry and under the supervision and direction of its Division of Animal Industry.

If the swine industry of this Territory is to be allowed to continue according to present methods, with not even a semblance of sanitation in 99 per cent of cases, then this industry is going to be subject to periodic outbreaks of disease. These outbreaks are going to occur in spite of vaccination and may, in certain instances, occur because of it. With the institution of proper sanitary measures rigidly and intelligently enforced, 95 per cent of the present swine troubles will be eliminated, and this elimination will have been effected without exposing the swine industry to virulent infection from without.

At different times the question of the introduction of the virus of hog cholera has been brought up, with the idea of using this virus in the control of swine disease in this Territory. While not definitely

committed to a single-method policy, this Division is, nevertheless, opposed to the introduction of an unattenuated, highly virulent virus in the control of any infectious and contagious disease of live stock. Such introduction and use has never yet, wherever tried, accomplished the eradication of any disease.

As far as hog cholera virus is concerned, its introduction into this Territory is not warranted in view of the fact that the filtrable virus disease of swine, i. e., hog cholera, has never definitely been proven to exist here. Furthermore its introduction at the present time and under the present circumstances—absolute lack of control of the sanitary conditions connected with the swine industry and absolute inability to control the spread of the virus, with the means at our disposal, renders such introduction extremely dangerous and inadvisable, to say the least.

Strict sanitation, combined with the use of a potent serum, will eliminate the danger of hog cholera, and is all that is necessary to control the disease and is, moreover, an entirely safe method and will lead to final complete eradication, the goal which should always be kept in mind.

In the control of infectious and contagious diseases there are two outstanding principles which must be strictly observed, namely:

1. Eliminate the spread of the infection and you have controlled the disease.

2. Eliminate the source of the infection and you have eradicated the disease.

Needless to state, if the outbreak is confined to the original center of infection the loss from such outbreak is kept at a minimum and the source of the infection is more easily and completely eliminated and those agencies which are known to be responsible for the spread of the infection are rendered harmless. It should also be self evident that you cannot eliminate the infection if you are going to import it by the quart in the most virulent form possible.

EAST HAWAII

Dr. Elliot reports as follows:

Tuberculosis Control—During the past month a total of 193 head of cattle were tested, of which number 191 passed and two were condemned and branded.

Bovine Hemorrhagic Septicemia—The outbreak of this disease on the Kaualu Ranch has been kept to one paddock. During the past month eight deaths occurred, and a total of 1,805 head of cattle were vaccinated.

WEST HAWAII

Dr. Rowat reports as follows:

Tuberculosis Control—The work in this field was confined to procuring signatures to indemnification vouchers and making autopsies on condemned cattle.

Bovine Hemorrhagic Septicemia—Several scattered outbreaks of this disease occurred on the Parker Ranch, but owing to prompt measures being taken to confine the disease to the original centers of infection and the vaccination of all exposed cattle, the loss was kept at a minimum, there being but twelve deaths prior to vaccination and three deaths subsequent thereto. A total of 4,177 animals were vaccinated. This speaks very highly for the protection afforded by means of such vaccination.

Glanders—Several inspections were made during the month at the Puakea Plantation Company's stables, where cases of glanders had been found before, with the result that one acute case of glanders was found

in a mule. The animal was promptly shot, properly disposed of and the premises thoroughly disinfected.

This is the third or fourth time, within the last few months, that cases of glanders have been found in these stables. Such cases are occurring with alarming frequency and the most rigid measures should be enforced to clean up this entire district. Up to the present time the manager of this plantation has absolutely refused to co-operate in any way with Dr. Rowat, who has thoroughly explained the situation and has attempted to institute the necessary measures to clean up these stables and protect the district from the spread of this disease. So far Dr. Rowat has met with no encouragement from the management, and has been repeatedly hindered in his work. Under these circumstances I would therefore suggest that I be authorized to proceed to Kohala, vested with the necessary authority from the Board, to institute whatever quarantine measures and make whatever tests I might consider necessary to clean up this entire district.

The Kohala and Hamakua districts are the last stronghold of glanders in this Territory, and while such conditions as portrayed exist, constitute a grave menace to the entire Territory. Until these districts are cleaned up, this Territory cannot be proclaimed free from glanders.

MAUI

Dr. Fitzgerald reports as follows:

During the past month the work has consisted chiefly of combating outbreaks of bovine hemorrhagic septicemia in the Kula district and on the Ulupalakua and Haleakala Ranches. Deaths have been few; a large number of animals have been vaccinated and the situation is well in hand.

Respectfully submitted,

LEONARD N. CASE,
Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN

MARCH, 1922

April 11, 1922.

DR. LEONARD N. CASE,
Territorial Veterinarian,
Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir: I beg to submit the following report of work performed during the month of March:

TUBERCULOSIS CONTROL

The cattle in seventeen dairies, numbering 320 head, were tested. Ten head were condemned and branded as reactors.

RABIES TREATMENT

Two dogs were given the anti-rabies treatment at the Quarantine Station.

VERMIFUGE TREATMENT

Two Australian sheep dogs were treated for intestinal parasites and quarantined for two weeks.

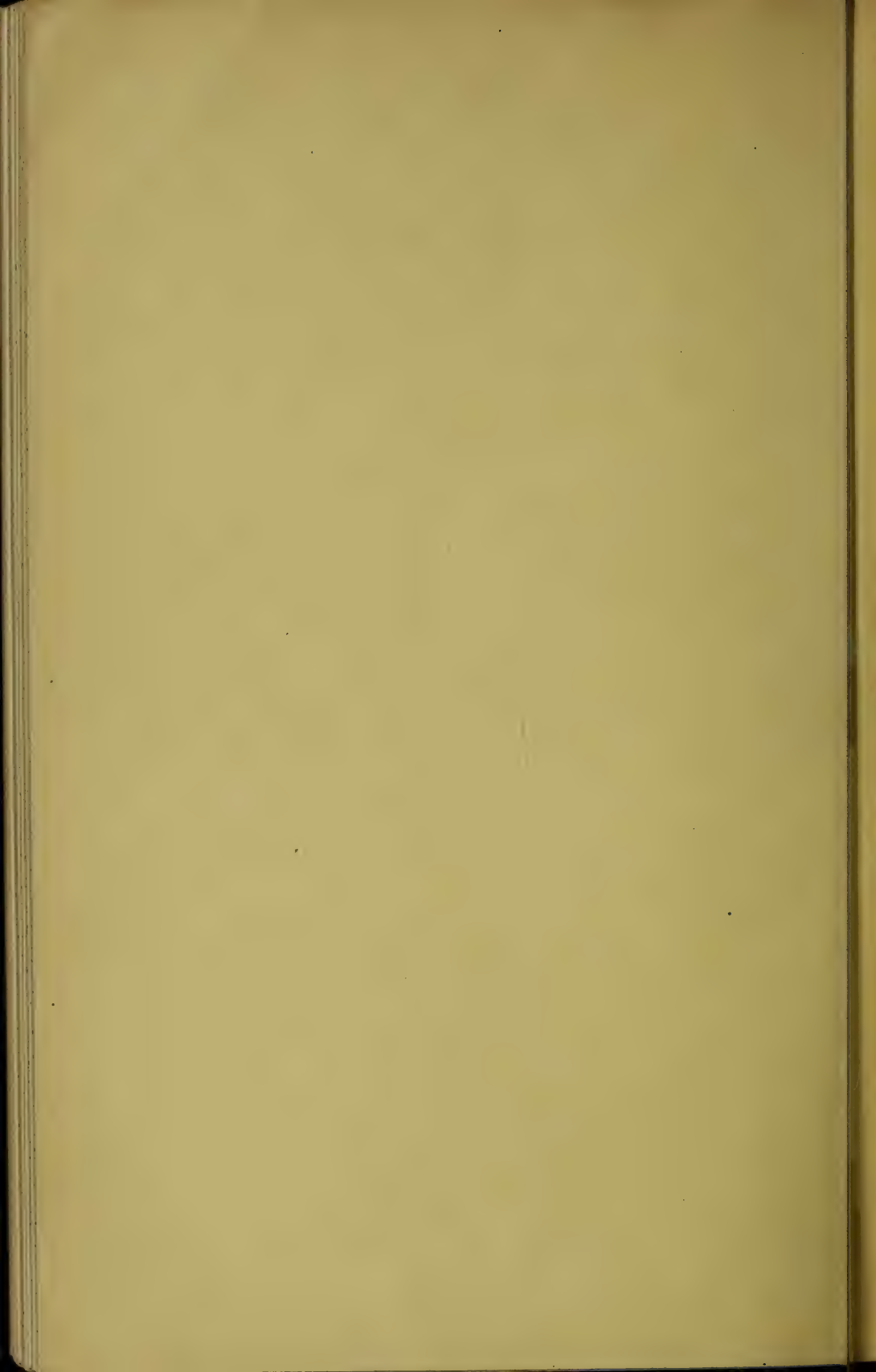
LIVE STOCK IMPORTATION

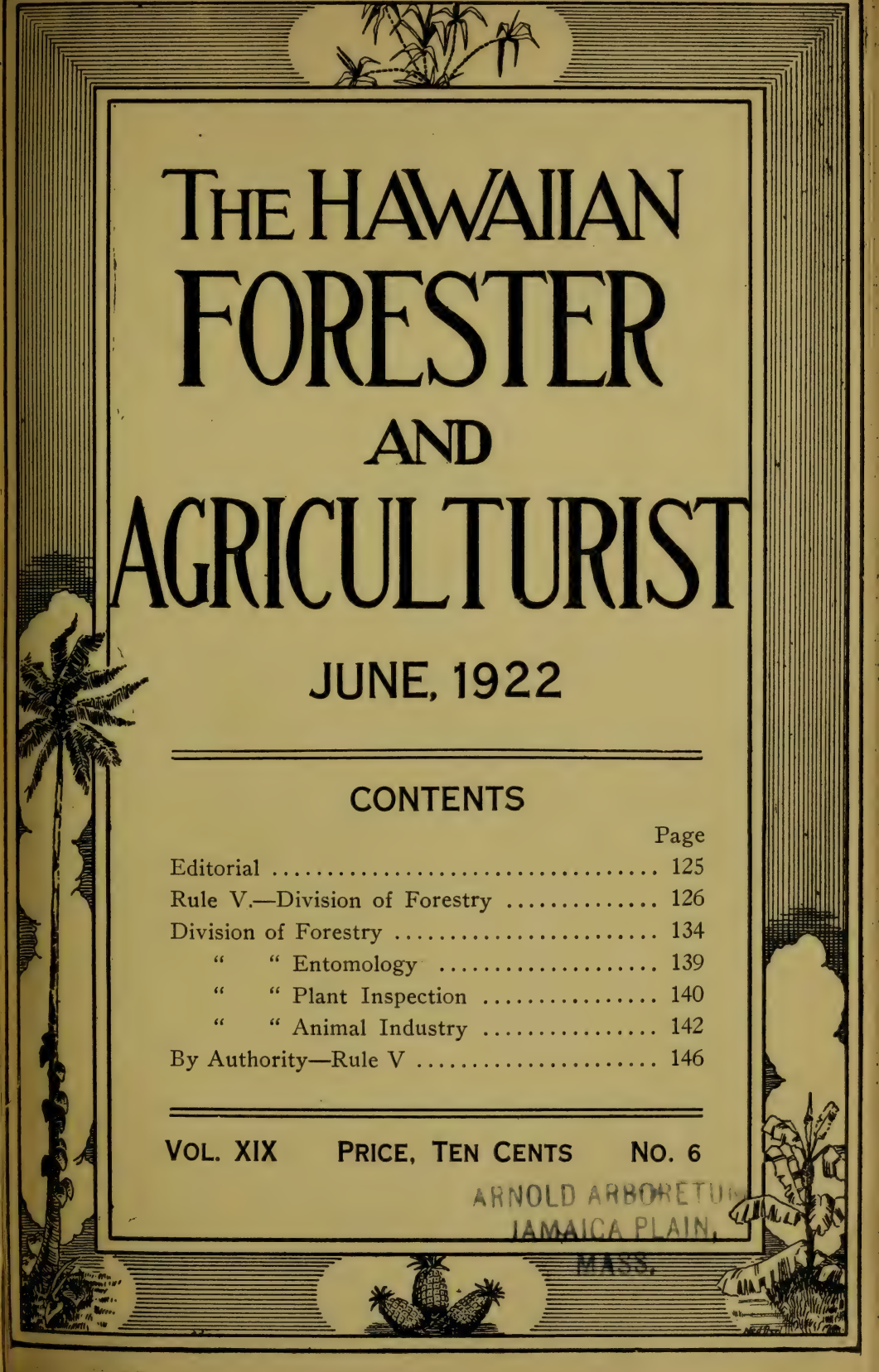
The following live stock was landed at this port and inspected:

Eleven dogs, 117 crates of poultry, 46 head of cattle, 8 head of mules, 34 head of hogs.

Respectfully submitted,

L. E. CASE,
Asst. Territorial Veterinarian.





THE HAWAIIAN FORESTER AND AGRICULTURIST

JUNE, 1922

CONTENTS

	Page
Editorial	125
Rule V.—Division of Forestry	126
Division of Forestry	134
“ “ Entomology	139
“ “ Plant Inspection	140
“ “ Animal Industry	142
By Authority—Rule V	146

VOL. XIX

PRICE, TEN CENTS

NO. 6

ARNOLD ARBORETUM
JAMAICA PLAIN,

MASS.



The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy; \$1.00 a year; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,
H. M. von Holt,

W. M. Giffard,
A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*

J. P. Pico, *Forest Ranger for Waialeale Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss Helen Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX.

HONOLULU, JUNE, 1922.

No. 6

Among the beneficial insects introduced from Mexico during the month were parasites and predators which work on the mealy bug, a pest which attacks the alligator pear and a few other trees in these islands.

The Division of Plant Inspection materially assisted the various departments which moved into the fine new federal building on April 1, by fumigating all of the furniture, office equipment, books, and records before they were moved from the old offices.

The Forest Nurserymen during the month gave expert advice and assistance in laying out and starting flower beds for the beautifying of the grounds around the Volcano House, Hawaii, in accordance with a comprehensive plan prepared by Commissioner W. M. Giffard.

The trees along the road on the narrow ridge between Pauoa and Makiki Valleys, below the top of Tantalus, were cleaned out during the month so that now, from an auto, one may have an unobstructed view of the Ewa district and Waianae Mountains on one side and Waikiki and Diamond Head on the other.

Among the trees planted out by the Division of Forestry during April were chir pines from India, Benguet pines and nipa palms from the Philippines, junipers from Bermuda, Cook pines and red cedars from Australia, cypresses from Arizona, and logwood trees from the West Indies.

Rule V of the Division of Forestry, which provides for the protection of the forest on a part of the Honolulu watershed at the head of Palolo and Manoa Valleys, which was adopted by the Board on December 6, 1922, was finally approved by the Governor on May 13, 1922, and went into effect at once. This new rule, with correspondence and reports bearing upon it, is printed in this number.

RULE V—DIVISION OF FORESTRY

PRESIDENT'S LETTER OF TRANSMITTAL.

Honolulu, Hawaii, May 12, 1922.

Hon. W. R. Farrington,
Governor of Hawaii,
Honolulu, T. H.

Sir: At a meeting of the Board of Agriculture and Forestry held yesterday, at which all of the Commissioners were present, full consideration was given to the objections to the promulgation of Rule V, Division of Forestry, as voiced by the Hawaiian Trail and Mountain Club and set forth in the minutes of a public hearing on this subject held on February 14, 1922, a copy of which is herewith presented.

The Commissioners also considered further evidence favoring the promulgation of the rule as set forth in a letter from the Superintendent of Forestry, dated May 3, 1922, and in a letter from Dr. H. L. Lyon, dated March 17, 1922, copies of which are also respectfully presented herewith for your careful consideration.

The Board unanimously decided that the benefits to be derived from the promulgation of the rule and the importance of putting it into effect at the earliest practicable date far outweigh any and all objections to it which have so far been presented and voted at this meeting to transmit the rule, which it adopted on December 6, 1921, to you with the earnest recommendation that it receive your formal approval.

I have the honor, therefore, to transmit herewith in duplicate for your approval Rule V of the Division of Forestry for the purpose of protecting the forest growth and protecting from contamination the water on the Palolo-Manoa Drainage Reservation, within the Honolulu Watershed Forest Reserve, together with a map of the area covered by the rule.

Very respectfully yours,

A. L. C. ATKINSON,

President Board of Agriculture and Forestry.

RULE V—EXECUTIVE OFFICER'S REPORT.

Honolulu, Hawaii, May 3, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: At the request of President Atkinson, I beg to submit the following comments on the objections made by the Hawaiian Trail and Mountain Club to the promulgation of Rule V of the Division of Forestry and to point out certain facts which impel me still to recommend most strongly the early promulgation of this rule.

In the public hearing of February 14, 1922, and in numerous articles which have since then appeared in the morning paper, a great deal has been said and written on extraneous subjects, interesting in themselves to be sure, but having no direct bearing on the promulgation of Rule V. Such subjects are beside the point and I will not take your time now to discuss them, but will limit this communication only to considerations which apply to Rule V.

CORRECTION

In the first place, permit me to correct an error, which through an inadvertent miscalculation, crept into my letter of January 23, 1922, to the Governor on this subject. On page 18, I should have said that the area to be closed, amounting to 1,480 acres, added to the prohibited area in Nuuanu gives a total of 3,390 acres, which is only 5 per cent of the total forest reserve area on Oahu and less than .9 per cent (not .009 per cent) of the total land area of Oahu.

Also, on page 13, I stated that none of the forest deterioration on the area covered by Rule V can be ascribed to grazing, because "so far as can be ascertained, there has never been any stock on the land." I will admit, although no substantial proof has been submitted, that cattle may have been responsible for a part of the damage to the forest at Kaau Crater in upper Palolo Valley.

OBJECTION TO RULE V

The real objection of the Hawaiian Trail and Mountain Club to the promulgation of Rule V, as I have gathered from the discussions, is that the members will be deprived of the personal pleasure of traveling over the trails which run through the area covered by the rule. It is unfortunate indeed that the area embraces one of the favorite and readily accessible haunts of hikers, but we must not close our eyes to the fact that the area is also a part of the watershed which supplies the City of Honolulu with water, both directly by surface streams and indirectly

through the artesian basins. The closing of this area will not burden anyone with an unjust hardship, and I am confident that time will prove the benefits to be derived by this wise precaution.

NOT ONLY TRAILS INVOLVED

The objections to this rule have all been confined to the closing of the trails across the area, as you have been constantly informed by the headlines, "A Plea for Mountain Trails." Please bear in mind, however, that Rule V is not confined to any particular trails, but embraces a forest area of 1,480 acres in the high mountain slopes at the head of Palolo and Manoa Valleys, a city watershed, on which certain trails happen unfortunately to exist. This rule is not directed against any particular trail, but is intended, as a measure for the public welfare, to protect the forest on the whole watershed. Unless the entire area is closed, the exercise of the established personal right of citizens to travel on any and all parts of the area may and will be enjoyed just as freely as on the public highway. In other words, the rule proposes to give better protection to a forest area on the city watershed and is not confined to a strip of vegetation along any trail. So long as the whole area is open to the public, all parts of it will be subject to forest disturbance by human beings, which results in detriment to the delicate forest and it is this that the rule seeks to terminate.

FEW OBJECTIONS TO THE RULE

In the discussions of this rule, strenuous and organized efforts have been made to discredit the rule and to minimize the damage, now going on, which the rule seeks to prevent. These appear to be prompted either by selfish personal motives, in the desire to keep the trails open for tramping, or by a surprising lack of sympathetic and intelligent understanding of city water supply sanitation and of the forest situation which exists on the area. The objectors do not seem to have given the whole situation serious consideration nor to have weighed all of the factors involved and struck a proper balance on the side of safety. It perhaps may not be reasonable to expect this of them, since most of them have resided in these islands only for a comparatively short period, and of course have not had the opportunity to learn from personal observation just how delicate the Hawaiian forest is and how sensitively it reacts to outside interference.

Against the dozen or so who object to the rule merely on selfish grounds, there are hundreds who understand the purpose of the rule, realize its necessity for public reasons, and urge its immediate promulgation.

WATER POLLUTION

It is contended that no water from the area enters the city water system and hence there is no danger of pollution. It was admitted, however, that the trail which this rule will close up did cross an area draining into Nuuanu Reservoir No. 4, but that the danger of disease microbes being introduced into the city water system from this source is infinitesimal, if not impossible, because water purifies itself in flowing approximately 1,000 feet in a formation such as exists there.

The Sanitary Engineer of the Territorial Board of Health informs me that this last statement is misleading and is based on a theory that has long been discarded by physicians and sanitary engineers. A single discharge of the bowels of a typhoid carrier may contain one billion typhoid bacilli, perhaps more at times, and 1 per cent of this is large enough to do immense damage. One person can discharge in one evacuation of urine enough typhoid germs to place one or more of these germs in every glassful of a 5,000,000,000 gallon reservoir. When nature calls, and her message is of a certain character, we all obey that call without unnecessary delay. In the self-purification of streams it is not a question of the distance that the water flows, but rather of the time it takes for the water to flow from one place to another. The majority of sanitary engineers today hold that water once contaminated is always dangerous until purified, and that polluted water derived from a quick-spilling watershed, such as this, must always be relatively impure and dangerous.

A sample of earth taken a few years ago from the trail between Nuuanu road and Hillebrand Glen was found upon analysis to contain *Bacillus coli*, showing how readily the casual trespasser carries germs on his boots from the polluted surface of the road into the watershed forest reserve.

It will be seen from the above that there is today great danger in the contamination of the city water supply if the area embraced by Rule V is to remain open to trampers, by the pollution of water running into Nuuanu Valley from the region of the Manoa-Nuuanu Ridge. As I have previously shown, there is danger also of pollution of the surface supply which is used for domestic purposes by the residents in upper Manoa Valley who are above the city mains. The headwaters of these surface streams are crossed by the trail which runs across Rule V area from Mt. Olympus to Pauoa Flats, and are exposed to direct contamination by trampers.

This rule, however, does not contemplate only present needs, but looks to the future, when there will be a much greater demand for water. The surface water in the Palolo Stream was used in the city mains up to a year and a half ago, and the manager of the city water works informs me that it is needed and

will be used again in the near future if trampers and trespassers can be kept off the watershed and be eliminated as a pollution danger.

NEED FOR PURE WATER

The Honolulu Water Commission, in its report of 1917 to the Mayor of Honolulu, stated as follows:

"The Commission is of opinion that all water from all sources on this island will at no distant date be needed for agricultural, irrigation and municipal use, and that the preparation of plans looking toward that end, and covering the island as a whole, should be undertaken without delay, in order that those sources which will furnish the most water at least cost may be first developed."

This Commission recommended plans towards this end which would utilize the waters in the five small streams and their tributaries at the head of Manoa Valley from the Waiakeakua, which starts just below Olympus, to the Waihi Nui in the northwest corner of Manoa Valley, just below Konahuanui. The present trail from Olympus to the Manoa-Nuuanu ridge crosses the beginning of most of these quick-spilling streams and thus exposes the water in them to ready contamination. By a mere glance at this region from the lowlands, it may be seen that it is obscured practically all the time by rain clouds. The ground in this region is saturated with moisture. If this water is to be used in the near future in the city mains for potable purposes, as it is today by residents in upper Manoa Valley, the danger of infection is far from infinitesimal, to say the least. There is not one tramper out of ten who does not pollute the country through which he traverses, for nature's calls are not to be put aside.

Modern sanitarians place themselves on record emphatically as favoring any and all reasonable attempts to head off at the source dangerous pollution of surface waters, and assert that minimization of initial pollution is splendid water supply sanitation.

To delete the heavy cost of pumping artesian water for city use the present plans of the City Water Works Dept. contemplate more extensive use of surface waters from the city watershed. The burden of making these surface waters pure and keeping them so is now upon us.

The dice of God are always loaded, and it is just as well to be prepared for the worst. It is far better to close the barn door before the horse is out rather than to await the teachings of a striking lesson from a severe city epidemic, which will be the cause of a generous human expedition hurried toward eternity, and receiving its tickets from a polluted water supply.

REGARD FOR FUTURE

Forestry is a long term investment and this is the main reason why it usually can be practiced only by organized government. A forester must necessarily have vision and must see far ahead into the future. He cannot think merely in years and deal only with the present. He must think in centuries which conform more closely to age of the trees composing the forest he deals with.

It is high time now to consider the future needs of our fair city and of its unborn population. Our heritage to them must not be diminished, and it is incumbent on us now to improve conditions so that there will be an improvement instead of a degression when our term of responsibility is over.

I fail to agree with those pessimists who throw up their hands in despair and say "you cannot spoil a rotten egg." Anything we can do now in the way of guarding the purity of the water and improving the forest cover on this watershed, it is our bounden duty to accomplish.

FOREST PROTECTION

Conditions on the steep mountain slopes at the head of Palolo and Manoa Valleys, embraced by Rule V, are not naturally favorable for tree growth and the forest there leads a very precarious existence. The mountain slopes are subject to frequent landslides which carry away the tree growth in wide swaths. These scars are soon reclothed with vegetation, to be sure, but in the early stages only with low forms of plant growth. While these scars are seemingly grown over and disappear before the eye, their new covering is not satisfactory for water conservation purposes, for it does not contain the tree element. On such situations a good deal is asked of tree growth, for the seedlings must start in extremely shallow soil on a steep gradient often exposed to severe winds. The establishment of a forest here is hampered by a severe handicap, not realized by many, and it requires at least a hundred years for a tree to reach maturity. It is a wonder that any forest at all can grow or maintain itself under such conditions, and when the extra burden of fighting against an aggressive introduced plant is imposed on the forest, we have a situation that is alarming and that requires all the feeble assistance that man is able to render.

HILO GRASS

Anything that can be done to ease the burden of life in this forest, which is severe enough under ordinary conditions, must be done if the forest is to be maintained. Human assistance in this struggle is small enough, to be sure, but possible to a limited extent. This assistance may be rendered directly by preventing

the further introduction of Hilo grass seed into such a forest, and the promulgation of Rule V will accomplish this.

Notwithstanding assertions to the contrary, the translation of Hilo grass seed into this area is accomplished more by trampers who traverse the area than by the sparse population of rats, mice or mongoose and birds. Who has seen mynah birds,, for example, in tall Hilo grass full of seeds, fly up into the air and make direct for this upper region? And where would they alight when the forest was attained? On tree branches, naturally, whence whatever seed they might carry would fall to the dark ground beneath and fail to germinate for lack of sufficient sunlight or a suitable seed bed.

I maintain that trampers are responsible for the introduction of seed which grew into the Hilo grass patch now found on the summit of Olympus, in spite of the fact that surveyors once cut some bushes there. It is admitted by all that trampers carry in grass seed along a trail. The speed with which grass infection will take place depends upon the number of people using the trail and the frequency of their trips over the trail. Just so long as the region is subject to visitations by human beings who must first cross through areas already infested with Hilo grass, and therefore carry grass seed with them, so long will the forest be exposed to a damage that is preventable.

I maintain that Hilo grass in the area covered by Rule V is an element of danger which threatens the existence of the necessary forest on this watershed and that it is necessary to prevent added infection by keeping out trampers, through the promulgation and enforcement of this rule.

In support of the certain damage done to the forest by the spread of Hilo grass under the peculiar conditions existing in our islands, and particularly in the region covered by Rule V, be it "in direct contravention to the experience of botanists in all parts of the world" or not, I respectfully present and recommend to your careful study the attached copy of a letter dated March 17, 1922, from Dr. H. L. Lyon, who is fully qualified by his intensive experience in these islands and by his intimate acquaintance with the indigenous forest, by wide observation, to discuss the subject.

FERN WEEVIL DANGER

One additional reason, not hitherto brought out, for the necessity of the promulgation of Rule V, in the interest of forest protection, is the elimination of the menace of the Australian fern weevil. This is a destructive insect which does not fly, but which is transported with ease from one place to another on the clothing and impedimenta of pedestrians. It is a destructive pest which attacks the tender native ferns, chiefly the *amaumanu*. This fern is abundant throughout the region covered by Rule V, and should the weevil be transported by some unfortunate chance to this

area, as it sooner or later will be if the region is kept open to tramping, it will attack these tender ferns and cause the destruction, as it has on Tantalus, of one of the most vital elements of the important forest cover. When this region is approached by the Tantalus route, where the weevil is abundant, there is every chance that before long pedestrians will unwittingly carry this weevil up into the higher mountain region, from which it is very important that it be absolutely barred.

CONCLUSIONS

1. No valid reasons, beyond the gratification of personal pleasure, have been presented against the promulgation of Rule V.

2. Danger of pollution, both now and in the future, of the water on the area covered by this rule will continue to exist just as long as it is left open to the public.

3. Continued tramping on the area will leave it open to new Hilo grass infection, which is detrimental to the forest, and to the possible introduction of the destructive fern weevil.

4. The forest on this area is extremely important for the conservation of water for supplying the increasing needs of the city of Honolulu. The demands of thousands of its inhabitants are opposed to the wishes of a handful of recreationists.

5. The forest maintains itself here under natural conditions with extreme difficulty.

6. Any outside element such as the invasion of a fast-growing and voracious intruder, as is found in Hilo grass, simply adds to the burden of the forest in maintaining the struggle for existence, and must be excluded so far as it is humanly possible.

7. The prevention of additional Hilo grass infection and of fern weevil infestation can be accomplished by closing the area to trampers.

RECOMMENDATION

For the above reasons, I earnestly recommend that Rule V of the Division of Forestry, adopted by the Board on December 6, 1921, be formally transmitted to the Governor for approval and promulgation.

Respectfully submitted,

C. S. JUDD,

Executive Officer and
Superintendent of Forestry.

DIVISION OF FORESTRY

REPORT OF SUPERINTENDENT OF FORESTRY, APRIL, 1922

June 8, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of April, 1922:

FOREST PLANTING

Reforestation work during April resulted in the planting out of 2,120 trees on four different forest reserves, as follows:

Oahu—Honolulu Watershed Reserve at Tantalus:	
Chir pine (<i>Pinus longifolia</i>).....	39
Benguet pine (<i>Pinus insularis</i>).....	63
Arizona cypress (<i>Cupressus Arizona</i>).....	100
Cook pine (<i>Araucaria Cookii</i>).....	50
Juniper (<i>Juniperus Bermudiana</i>).....	29
Australian red cedar (<i>Cedrela australis</i>).....	134
Koa (<i>Acacia koa</i>).....	68
Ti plants (<i>Cordyline terminalis</i>).....	310
Oahu—Lualualei Forest Reserve at Mikilua:	
Logwood (<i>Haematoxylum campechianum</i>).....	641
Oahu—Ewa Forest Reserve at Aiea:	
Swamp mahogany (<i>Eucalyptus robusta</i>).....	600
Hawaii—Hilo Forest Reserve at Laupahoehoe:	
Lemon gum (<i>Eucalyptus citriodora</i>).....	86
Total number of trees planted.....	
2,120	

The coniferous trees were planted on Tantalus to test their adaptability to the elevation (2,000 feet) found at that planting site. The koa trees were planted near the same region by Boy Scouts of Troop Four.

The ti plants were set out in Makiki Valley in accordance with the plan, mentioned in my last report, of providing a supply of ti leaves to meet future demands. The planting at Aiea is the first in connection with the agreement with Joseph Alexander and assumed the form of a necessary windbreak.

On April 29, 200 nipa palm (*Nipa fruticans*) seeds were received from the Bureau of Forestry in Manila in fairly good condition. Some of these were immediately distributed for planting at Haleiwa, Oahu, and along the leeward shore of Molokai, near Palaau.

A compilation of reports on the number of trees planted throughout the Territory during 1921, shows that a total of 383,458 trees were so planted. This is only 36,635 trees less than the number planted in 1920. Of the total number planted, 44,261 trees consisting of 33 different species were set out by the Division of Forestry on eleven different forest reserves on the four main islands.

FOREST FENCING

The following new fencing work was reported during the month:
New fences—Oahu: Kulionou Forest Reserve..... .07 miles
Hawaii: Hilo Reserve, Lot 17, Opea-Peleau..... .04 miles
Hawaii: Hilo Reserve, Piha..... .08 miles

Hawaii: Kau Reserve, Waiohinu .....	.67 miles
Total length new fences.....	.86 miles
Fences repaired—Kauai: Moloaa Reserve .....	.11 miles
Hawaii: Olaa Forest Park, Sec. A.....	.94 miles
Hawaii: Olaa Forest Park, Sec. C.....	.08 miles
Hawaii: Kau Reserve, Keolakaa.....	1.27 miles
Total length fences repaired.....	2.40 miles

During the month arrangements were made for considerable additional fencing along the boundary of the Hilo Forest Reserve, in co-operation with the owners of adjacent lands.

WAILUA COCOANUT GROVE

Owing to the legal difficulties involved in the management were it made a forest reserve, upon mature deliberation, I have concluded that it would be unwise to follow the suggestion, made in my January report, to set aside the cocoanut grove on Government land at Wailua, Kauai, as a forest reserve. I have, nevertheless, requested the Land Commissioner to insert in the new lease of this grove, a clause whereby this Board will be able to secure free of charge each year 500 cocoanuts for planting purposes.

SALE OF FENCE POSTS

During the month 500 posts, cut from dead mamani trees in the Kula Forest Reserve, Maui, were sold for 10 cents each, and the proceeds turned into the special forestry fund.

FOREST FIRE

On April 23 a grass fire started on Maili Ridge, near Schofield Barracks, and burned over approximately 25 acres before it was extinguished by soldiers. The dampness of the vegetation in the ravines prevented the fire from destroying any tree growth.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASST. SUPERINTENDENT OF FORESTRY

APRIL, 1922

May 15, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following statement of my activities during April, 1922, is respectfully submitted:

FIELD TRIPS

A short trip was made with the Superintendent on April 8 to inspect the operations of Mr. J. Alexander, who is breaking new ground for

pineapple culture on government land in the Aiea section of the Ewa Forest Reserve. Under the terms of his agreement with the government, Mr. Alexander is required to plant trees annually under our direction within the reserve and ultimately to plant all of the cultivated area with trees. This work is now proceeding satisfactorily and plans are made for future tree plantings.

MAPS

Map work, which was given attention during the month, included completion of the Prison Camp detail of the Round Top Forest Reserve; completion of the ownership map of the Tantalus house lots; checking and correction of the official description and map of the Hilo Forest Reserve boundary; checking of the combined Olaa-Waiakea Forest Reserves map. Steps were taken to complete the fencing of the Punahoa section of the Hilo Reserve boundary.

TANTALUS DRIVE

A small crew was employed for several days at improvement-cutting of trees bordering the ridge portion of the Tantalus Drive above the Thurston lot. By the removal of dead and superfluous wood from a number of old koa trees, several vistas have been opened up giving views of Pauoa Valley and Pearl Harbor. There is need for more of this work along the drive, which is so badly overgrown in many places as to be dangerous to traffic.

SEED STUDY

A nursery seed-study of the Italian Cypress (*Cupressus sempervirens*) was initiated on April 12, for the purpose of testing seed collected from trees on the island of Maui. The experiment is described in detail in a separate working plan and in a brief article for "The Forester."

LECTURES AND ARTICLES

Two lectures on forestry were given, one on April 1 to students of the short course in pineapple culture at the University of Hawaii, and one on April 8 to the horticulture class of Professor Krauss.

Three short articles for "The Forester" were prepared during the month.

CO-OPERATION

Several days were given to co-operation with Mr. Griffin, who has lately been engaged, through efforts of the Outdoor Circle, to organize the work of caring for the city shade trees. An ordinance placing this work on a basis similar to that of mainland cities was drafted and has passed its first reading of the Board of Supervisors. Consultations were held with Mr. Griffin and the president of the Outdoor Circle relative to needed tree work in various parts of the city.

VISITORS

People interested in forestry who called at the office during April included Dr. F. A. Nordbye, of Alberta, Canada, and Mr. Hugh Maurice, of the Forest Products Laboratories at Vancouver, B. C. During the absence of Mr. Haughs, advice on planting was given to a number of people.

Respectfully submitted,

C. J. KRAEBEL,
Asst. Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, APRIL, 1922

May 26, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: I herewith submit a report of the principal work done during the month of April:

NURSERY DISTRIBUTION OF PLANTS

The number of plants distributed, including those sent to forest reserves, are as follows:

	Transplant Boxes	Pot Grown	Total
Oahu—Sold	50	236	286
—Gratis	300	1,792	2,092
			<hr/> 2,378

SUB-NURSERIES

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Maui and Molokai .....	....	324	342	666
Kauai .....	....	....	4,117	4,117
Hawaii	11,000	3,495	55	14,550
				<hr/> 19,333
Total for all Islands.....				21,711

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of plants, Government Nursery	\$ 7.00
Sale of plants, Hilo Nursery	2.55
Rent of Office Nursery Ground for March.....	35.00
	<hr/>
Total.....	\$44.55

PRESERVATION OF FOREST RESERVES

Permit fee for 1922, Kokee Camp Site No. 28.....	\$ 3.75
Permit fee for 1922, Kokee Camp Site No. 30.....	6.75
Three cords guava wood from the Waiahole Forest Reserve.....	7.50
500 Mamani fence posts from dead trees from the Kula Forest Reserve.....	50.00

BLACK SAND

114 loads of black sand taken from the Makiki Valley Sand Pit at \$0.50 per load.....	57.00
	<hr/>
Total.....	\$125.00

ANIMAL INDUSTRY REVOLVING FUND

April 22—Parker Ranch, vaccine.....	\$442.50
“ 22—Miss Miles Minter, rabies treatment.....	1.50
“ 22—Captain R. H. Dixon, rabies treatment.....	1.50
“ 27—Pat Shea, rabies treatment.....	1.50
“ 27—G. H. Miller, rabies treatment.....	1.50
“ 28—Haleakala Ranch, vaccine	17.50
Total.....	\$466.00

MAKIKI STATION

The work done at Makiki consisted of the regular routine. We have quite a large stock on hand and will be well prepared when the planting season arrives.

HONOLULU WATERSHED

The following trees were planted by Ranger David Kapihi on the south bank of the hollow, right behind Tantalus top (This hollow used to contain water forming a pond, but the water disappeared about 25 years ago and has not made its appearance again, as far as I know): 63 *Pinus insularis*, 39 *Pinus longifolia*, 100 *Cupressus Arizona*, 50 *Araucaria Cookii*, 29 *Juni-perus Bermudiana*.

The regular gang planted, in addition to other work mentioned above, 310 *Cedrela australis* where others had disappeared.

TRIP TO THE VOLCANO

From April 8 to April 22 the writer was authorized to make a vacation trip to the Volcano House. While there he assisted in the work of remodeling the flower garden.

ADVICE AND ASSISTANCE

The writer, at the request of people in and around the city, made calls and otherwise gave advice as follows:

Calls made, 6; advice given to people calling, 8; advice given by telephone, 5.

Respectfully submitted,

DAVID HAUGHS,

Forest Nurseryman.

DIVISION OF ENTOMOLOGY

REPORT OF ENTOMOLOGIST, APRIL, 1922

May 26, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: During the month of April the insectary handled 7,800 pupae of the melon fly, from which there were bred 1,634 females and 1,652 males of *Opius fletcheri*.

The distribution of parasites was as follows:

MELON FLY PARASITES

Opius fletcheri

Maui—Mr. H. W. Rice, Paia.....	600 females	600 males
—Mr. R. Von Tempsky, Kehei.....	250 females	250 males
—Mr. A. V. Mariel, Jr., Kaupo.....	100 females	100 males

FRUIT FLY PARASITES

Diachasma Tryoni

Oahu—Mr. P. Ho Tong, Beretania St., Hon..	200 females	200 males
—Mr. Henry Chung, Kaimuki, Hon.....	100 females	100 males

Diachasma Fullawayi

Oahu—Mr. Henry Chung, Kaimuki, Hon...4..	50 females	50 males
—Mr. P. Ho Tong, Beretania St., Hon....	60 females	60 males

Dirhinus Giffardii

Oahu—Mrs. George Sherman, Nuuanu Ave., Hon..	400 males and females	
--	-----------------------	--

Opius Humilis

Oahu—Mr. P. Ho Tong, Beretania St., Hon....	100 females	100 males
---	-------------	-----------

Galesus Silvestrii

Oahu—Mrs. George Sherman, Nuuanu Ave., Hon..	600 males and females	
--	-----------------------	--

Tetrastichus Giffardianus

Oahu—Mr. P. Ho Tong, Beretania St., Hon.....	800 males and females	
—Mr. Henry Chung, Kaimuki, Hon.....	600 males and females	

The time of the Entomologist has been occupied principally in handling the consignments of beneficial insects from Mr. Osborn, who is now in the Vera Cruz district of Mexico.

Two shipments were received from Orizaba, one on the 18th, and another on the 25th. Besides containing tumble bugs in good condition, there were also a number of parasites and predators supposed to be attached to the avacado mealy bug (*P. nipae*), some of which have been liberated and others retained to experiment on rearing and multiplying them.

Considerable time has also been spent studying the mealy bugs in connection with this work, and some time has been given to carrying on investigations and experiments in the control of pineapple insects.

Respectfully submitted,

D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION

REPORT OF CHIEF PLANT INSPECTOR, APRIL, 1922

April 29, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of April, 1922, as follows:

During the month we boarded 50 vessels, 23 of which carried vegetable matter and 10 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	1,299 lots	24,218 pkgs.
Fumigated	2 lots	2 pkgs.
Burned	111 lots	111 pkgs.
Returned	8 lots	8 pkgs.
Total inspected.....		1,420 lots
		24,339 pkgs.

Of these shipments, 23,932 arrived as freight, 230 as baggage and 177 as mail.

RICE AND BEAN SHIPMENTS

23,955 bags of rice and 897 bags of beans from the U. S., and 1,743 bags of rice and 3,002 bags of beans from Japan arrived, all clean.

PESTS INTERCEPTED

Approximately 3,869 pieces of baggage belonging to immigrants from foreign countries were examined, from which 53 lots of fruit and 46 lots of vegetables were seized and destroyed. A tabulated list of material intercepted, other than the above-mentioned, follows:

From California:

Pseudococcus gahani and *Aphis brassicae* on plants, A. R. X.

From New Zealand:

Pseudococcus maritimus on pears, cargo.

PROHIBITED MATERIAL BURNED

Six lots Central American bananas, baggage from California.

Bamboo shoots, baggage from China.

Plants, baggage from China.

Sugar cane, baggage from China.

Tree seeds, baggage from Manila.

MATERIAL FUMIGATED

Plants, A. R. X. from California, infestation.

Cotton seed, mail from Washington, D. C., precautionary.

MATERIAL REFUSED ADMITTANCE

Pears, cargo from New Zealand, infestation.

Florida grapefruit, cargo from Seattle, prohibited.

BENEFICIAL INSECTS

The following beneficial insects were received during the month and handled in the usual manner:

One package lady bugs, from Williams, Manila, to H. S. P. A.

One package *syrrhus* fly pupae for hornfly, Osborn, Mexico, to Board of Agriculture.

Two boxes parasites of *Pseudococcus nipae*, Osborn, Mexico, to Board of Agriculture.

Two boxes fig insects (*Blastophaga*), brought by Williams, Manila, to H. S. P. A.

One basket parasites for beanpod butterfly and wasps for caterpillars, to H. S. P. A.

HILO INSPECTION

Brother M. Newell, inspector at Hilo, reports the arrival of nine vessels, with five carrying vegetable matter, consisting of 195 lots and 2,493 parcels. 9,046 bags of rice and 238 bags of beans were inspected. All material received was passed as free from pests.

KAHULUI INSPECTION

Mr. L. Gillin, inspector for Maui, reports the arrival of four vessels, all carrying vegetable matter, consisting of 12 lots and 662 parcels. 3,845 bags of rice and 84 bags of beans were inspected and passed.

INTER-ISLAND INSPECTION

Fifty-seven vessels plying between Honolulu and the other islands were attended and the following inspections made:

Passed—Taro, 92 bags; vegetables, 104 cases; fruit, 243 cases; plants, 174 packages; pine shoots, 1,500 bags; seeds, 1 package; sugar cane, 40 cases. Total, 2,154 packages.

Rejected—Plants, 13 packages; fruit, 1 package. Total, 14 packages.

LOCAL FUMIGATION

During the month we undertook the fumigation of the furniture, books, records and other belongings of the various departments of the Federal Government before they were moved into the new Federal Building. Much of the furniture was attacked by termites, and books and records by the leather beetle and silver fish. The Federal Government furnished the necessary chemicals and did all the labor of filling and emptying the fumigation rooms, but the actual fumigation was done under our own supervision.

Respectfully submitted,

E. M. EHRHORN,

Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

REPORT OF TERRITORIAL VETERINARIAN, APRIL, 1922

May 24, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I beg leave to report as follows on the work of the Division of Animal Industry for the month of April:

TUBERCULOSIS CONTROL

From the appended report of the Assistant Territorial Veterinarian it will be seen that a total of 1,028 head of cattle were tested during the month, out of which number 943 were passed and 85 condemned and branded, most of which have already been slaughtered.

The entire number of reactors came from two dairies, the Waianae Company and the Wahiawa Dairy Company. Interest centers particularly in the Waianae Company's herd, which is heavily infected with tuberculosis and from which, under present existing circumstances, it will be difficult indeed to eradicate the disease. This herd is in practically all respects similar to the Perry herd at Wailupe. Tuberculosis can be eradicated from such herds if the necessary co-operation is given by the owner, but it is going to take years to accomplish it and at an expenditure of money wholly unwarranted when the value of the cattle involved is considered.

The stock of these two ranches is worth little or nothing beyond the carcass value. They cannot even be used as a foundation for improvement, as purebred bulls from clean herds would almost certainly be condemned for tuberculosis within a very short time after being placed in such a herd. Such herds should be disposed of through the slaughterhouse as rapidly as possible. This method was advocated some time ago by both Dr. Norgaard and myself in connection with the Wailupe herd. It is neither profitable for the Territory nor the owner to continue testing such herds. The interest of the milk-consuming public on the one hand, and the tuberculosis eradication campaign on the other, demand the elimination of such herds by the most rapid method possible.

As an illustration, take the case of the Waialae Dairy: After the first test, in May of 1910, I personally advised Mr. Isenberg to dispose of the balance of the herd through the slaughterhouse, tear down the old buildings and erect a concrete barn, on a new location, large enough to hold 200 head and to purchase a new herd of cattle from clean herds. My advise was entirely ignored and Mr. Isenberg expressed himself decidedly and emphatically on the "brand" of advice that I offered him. What was the result? New cattle were continually added to the herd and as continually condemned; long ago the last animal in the original herd was condemned on test and slaughtered, and a conservative estimate places the loss to the Isenberg Estate at \$250,000 for condemned cattle alone, to say nothing of what it has cost the Territory in indemnifications. With this amount of money the owner could have erected the finest dairy establishment in the Territory; purchased a considerable herd of excellent dairy cattle; eliminated tuberculosis from the premises, and still have been money in pocket.

This goes to show that there are times when it is more profitable for all concerned and the elimination of tuberculosis accomplished more rapidly if more drastic methods are employed. Of course, if such methods cannot be employed, continued testing of such herds must be resorted to as the only other method of eventually eradicating the disease.

Hemorrhagic Septicemia—No reports of hemorrhagic septicemia among cattle or swine on this island have been received during the past month.

Contagious Epithelioma—Several outbreaks of this disease among chickens were reported and a considerable amount of vaccine for controlling the outbreaks was sent out. Up until very recently reports on the use of this vaccine have been uniformly excellent. However, the last two reports have been decidedly unfavorable, as considerable loss was experienced in each case. Why this should be is not readily apparent, but is probably due to a certain lot of culture media purchased from the mainland. A new lot of vaccine is now in the course of preparation from organisms grown on culture media prepared in this laboratory.

HAWAII

From East Hawaii, Dr. Elliot reports as follows:

Port Inspections—Steamship Manulani, San Francisco, 3 ets. poultry; steamship Enterprise, San Francisco, 3 ets. poultry, 6 horses (Honolulu Sugar Company).

Permits were issued to John Vierra to ship 18 head of cattle to Honolulu via the steamship Mauna Kea.

Tuberculosis Control—The following cattle were tested during the past month:

Hawaiian Agricultural Company: Total, 37; passed, 37; condemned, 0.

One condemned heifer, belonging to W. H. Shipman, was examined at the slaughter-house of the Hilo Meat Company and lesions of tuberculosis found.

Hemorrhagic Septicemia—Two hundred and forty head of cattle owned by the Kaalualu Ranch were vaccinated. No deaths reported.

A small outbreak occurred in the Hilo-Onomea Dairy, with two deaths. All in-contact animals were vaccinated, and no further cases have occurred.

WEST HAWAII

Dr. Rowat reports as follows:

Glanders—Two trips were made into the Kohala District, and nothing found to arouse suspicion. At the Puakea stables they were again whitewashing and disinfecting the buildings. The water troughs are being drained and cleaned once a week, exposed to the sun for a day, and then thoroughly disinfected.

Hemorrhagic Septicemia—The Parker Ranch was visited three times during the month. Dr. Mills, the resident veterinarian, reported sporadic cases of hemorrhagic septicemia among unvaccinated animals, with no losses. Vaccination was immediately resorted to in each outbreak and the progress of the disease was promptly checked.

Last week, when I was in Waimea, Dr. Mills informed me that the total loss since the first appearance of the disease on the ranch, amounts to 50 head, and that no new cases have occurred within the last three weeks. Dr. Mills also stated that the vaccine being used was very efficient in controlling these outbreaks.

On the 22nd and 23rd a trip was made into Kona, and reports from those interviewed was to the effect that no outbreaks of disease of any kind had occurred in that district.

On the 27th a call came from the Huehue Ranch, where it was found that an outbreak of hemorrhagic septicemia had occurred the previous day, with five cases and three deaths. All stock in the infected paddock, 131 head in all, were vaccinated and the two sick ones given the serum treatment. A later report from this ranch was to the effect that no new cases had developed and that the sick animals were progressing in a favorable way.

MAUI

Dr. Fitzgerald reports as follows:

Hemorrhagic Septicemia—The past month has been devoted almost entirely to visits to the different ranches on which hemorrhagic septicemia has been prevalent, making examinations of cattle and performing autopsies on everything reported dead, so that there could be no possible chance of the disease getting out of hand. Some 680 head of young stock have been vaccinated and the pastures where the disease has occurred are being constantly watched. This disease has played a very serious part in its ravages this year, even though all in-contact animals have been vaccinated after the first death and the balance of the herd vaccinated as soon as possible afterwards. Mr. Rice's herd has suffered to the extent of 10 per cent of the calf crop up to date, although the most rigid methods have been adopted and a great amount of conscientious work done by the management toward the suppression of the disease.

Tuberculosis Control—Owing to the considerable amount of work being done in connection with the control of hemorrhagic septicemia, the tuberculosis control work has had to be abandoned for the present.

KAUAI

Dr. Golding reports as follows:

Tuberculosis Control—During the past month a total of 282 head of cattle were tested in 18 different dairies, out of which number 275 were passed and seven condemned and branded. These seven have since been slaughtered and positive lesions of tuberculosis demonstrated in each case.

Hemorrhagic Septicemia—No cases of bovine hemorrhagic septicemia have occurred on the island of Kauai during the past month. The hog situation at Makaweli is apparently under complete control owing to efficient measures of quarantine and sanitation. Under date of May 15th Dr. Golding states as follows:

"Have heard nothing further regarding the hog cholera situation at Makaweli and am hoping that no further foci of infection will crop up."

In the same letter he states that a number of cases of strangles or distemper have occurred among the young horses at Grove Farm. These cases have been isolated and treated and a general clean-up of the premises effected. No new cases have so far developed and no deaths reported.

Respectfully submitted,

L. N. CASE,
Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN

APRIL, 1922

May 24, 1922.

Dr. Leonard N. Case,
Territorial Veterinarian,
Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir: I beg to submit the following report of work performed during the month of April, 1922:

TUBERCULOSIS CONTROL

	Number of Cattle	Passed	Con- demned
Waianae Plantation	359	285	74
Oahu Railroad & Land Co.....	366	366	0
A. N. Campbell	3	3	0
Francis Gay	6	6	0
C. J. Day	3	3	0
A. Pacheco	15	15	0
John Teixeira	8	8	0
Kemoo Farm	130	130	0
Wahiawa Dairy.....	100	89	11
R. Tomita	9	9	0
Y. Ogawa	8	8	0
Geo. R. Carter.....	2	2	0
T. E. Robinson	2	2	0
Henry Damon	1	1	0
M. S. Teixeira	2	2	0
L. Y. Sang	12	12	0
W. B. Greenfield	2	2	0
Total.....	1,028	943	85

HOG INSPECTION

Piggeries at Puualoa, Pearl Harbor and Kemoo Farm were inspected. Those at Puualoa still remain in a filthy condition.

RABIES TREATMENT

Four dogs were given the anti-rabies treatment at the Quarantine Station.

LIVESTOCK IMPORTATIONS

The following livestock was received at this port:: Poultry 65 cts., dogs 3, cattle 5, hogs 3, mules 21.

The cattle were tuberculin-tested and the dogs given the anti-rabies treatment.

Respectfully submitted,

L. E. CASE,
Asst. Territorial Veterinarian.

BY AUTHORITY

TERRITORY OF HAWAII

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY

RULE V—DIVISION OF FORESTRY

The Board of Commissioners of Agriculture and Forestry hereby makes the following rule and regulation for the purpose of protecting the forest growth and protecting from contamination the waters on the Palolo-Manoa Drainage Reservation, within the Honolulu Watershed Forest Reserve, Oahu:

Section 1. All persons are hereby prohibited from allowing any stock to enter or graze and all persons are hereby prohibited from entering or going upon that portion of the Honolulu Watershed Forest Reserve known as the "Palolo-Manoa Drainage Reservation," hereinafter described. Provided, however, that this prohibition shall not apply to duly appointed forest rangers and other persons employed by the Territory of Hawaii, by the City and County of Honolulu, and by the United States while in the discharge of their official duties.

PALOLO-MANOA DRAINAGE RESERVATION

Beginning at the South corner of this piece, the East corner of Lot 12, Palolo Homesteads, and on top of ridge between Waiomao and Waialae Nui, the co-ordinates of said point of beginning referred to Government Survey Trig. Station, "Rocky Hollow," on the ridge between Waiomao and Kekio, being 685.5 feet South and 2482.2 feet East, as shown on Government Survey Registered Map No. 2554, and running by true azimuths:

1. 130° 00' 791.0 feet along Lot 12, Palolo Homesteads to South corner of Lot 13;
2. Thence along and around Lot 13, Palolo Homesteads by the following azimuths and distances:
 - (a) 218° 20' 128.0 feet to a rocky point on side of pali;
 - (b) 156° 21' 999.0 feet to XIII marked on large rock on edge of stream;
 - (c) Thence up along middle of stream to + on rock in stream, the direct azimuth and distance being 168° 05' 440.0 feet;
 - (d) 121° 10' 368.0 feet on top of ridge between Waiomao and Kekio;
3. Thence up middle of ridge along Kekio on the following direct azimuths and distances:
 - (a) 214° 40' 1690.0 feet to "Kaheka";
 - (b) 211° 42' 1217.0 feet to the South corner of land owned by the Government
4. 151° 40' 4100.0 feet across valley along remaining portions of Kekio and Kaea to a point on the ridge between Palolo and Manoa Valleys
5. Thence 960 feet more or less down middle of ridge along Kekio to the East corner of Grant 152, to Punahou School, at a place called "Keanapoe"
6. Thence 2000 feet more or less down "Keanapoe" ridge along Grant 152 to Southeast corner of Grant 3619, to Helen Boyd;
7. 192° 15' 850.0 feet across mouth of Waiakeakua Valley and along Grant 3619

8. 208° 30' 1010.0 feet up along ridge along Grant 3619;
9. Thence 1000 feet more or less up along ridge along Grant 116, to E. H. Rogers;
10. Thence 1600 feet more or less across Naniuapo Valley along Grant 116, L. C. A. 11029 to I. Stevenson, and Grant 154 to E. H. Rogers, to the top of Luaalaea ridge;
11. Thence 625 feet more or less down along Luaalaea ridge;
12. Thence 550 feet more or less down slope along government land of Luaalaea to Luaalaea Falls;
13. Thence 1100 feet more or less across government lands of Luaalaea and Waihi-iki to Waihi-iki Falls;
14. Thence 1000 feet more or less across government lands of Waihi-iki and Waihi to Waihi-nui Falls;
15. Thence due West up slope to top of ridge on the Eastern boundary of Land Court Petition No. 338 (Geo. R. Carter, Petitioner);
16. Thence up along middle of ridge along Land Court Petition No. 338 to Government Survey Trig. Station "Kaumuhonu" on the ridge between Manoa and Nuuanu Valleys;
17. Thence up along middle of said ridge along Luakaha to its junction with the main Koolau Range, at a peak called "Konahuanui";
18. Thence along the watershed of the Koolau Range across the head of Manoa Valley to the junction of Manoa and Palolo Valleys at a peak called Mt. Olympus;
19. Thence along same across the head of Palolo Valley to the ridge bounding Palolo and Waialae Valleys;
20. Thence down the middle of said ridge along Waialaenui to the point of beginning. Area 1,480 acres, more or less.

Section 2. Any person violating the above rule shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed five hundred dollars (\$500.00), as provided by Section 529, Revised Laws of Hawaii of 1915.

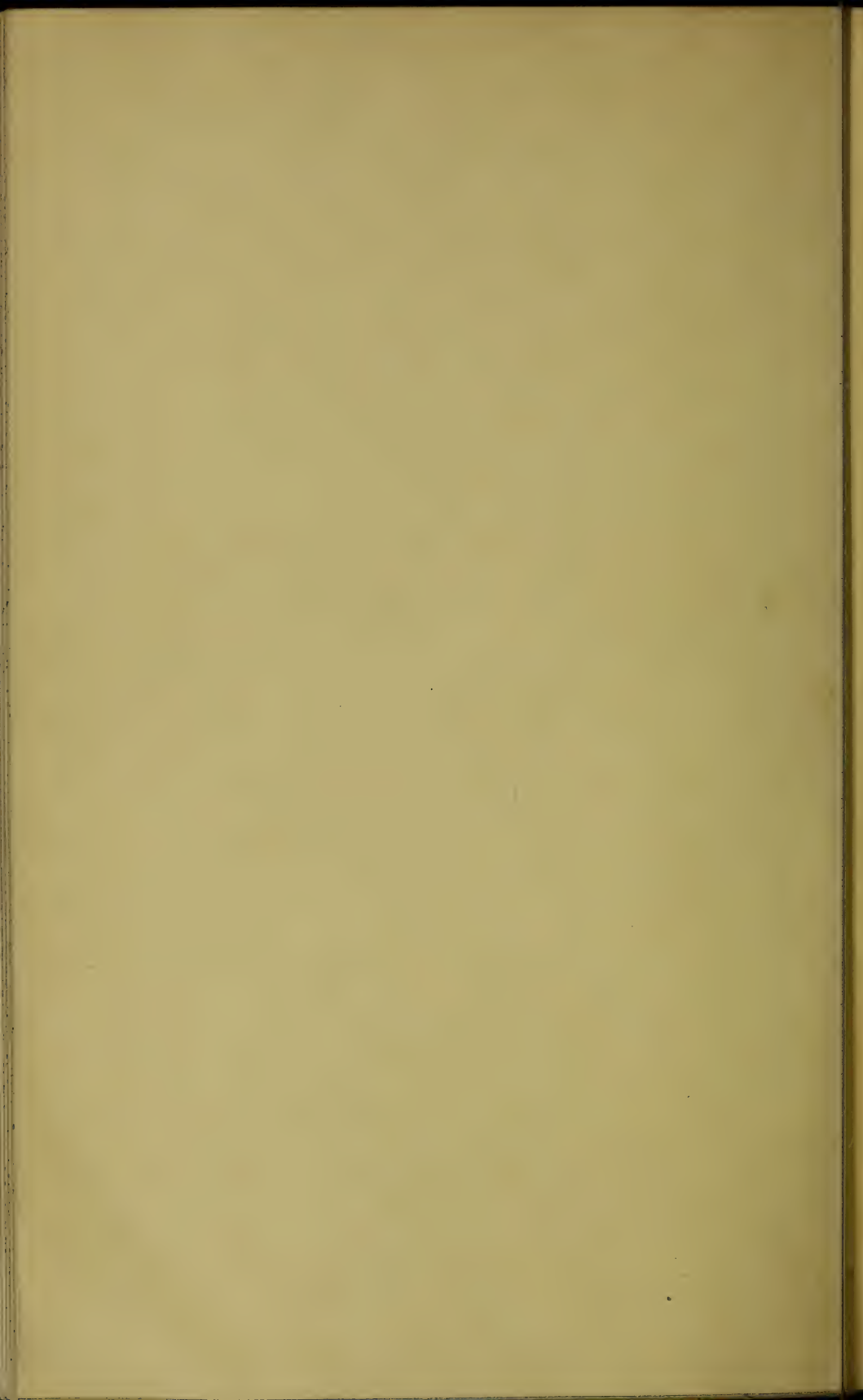
Section 3. This rule shall take effect upon its approval by the Governor.

Adopted on December 6, 1921, by the Board of Commissioners of Agriculture and Forestry.

A. L. C. ATKINSON,
President.

Approved this 13th day of May, 1922.
Honolulu, T. H.

W. R. FARRINGTON,
Governor of Hawaii.





THE HAWAIIAN FORESTER AND AGRICULTURIST

JULY, 1922

CONTENTS

	Page
Report on Experimental Forest Planting at High Altitudes of Maui and Hawaii, 4 Illustrations (Kraebel)	151
Hawaiian Forests (Lyon)	159

VOL. XIX

PRICE, TEN CENTS

NO. 7

ARNOLD ARBORETUM
JAMAICA PLAIN.

MASS.



The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy ; \$1.00 a year ; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,
H. M. von Holt,

W. M. Giffard,
A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

E. H. Hipple, *Forest Ranger for Palolo, Manoa, and Nuuanu, Oahu.*

J. P. Pico, *Forest Ranger for Waissae-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gilhin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss Helen Martin, *Stenographer.*

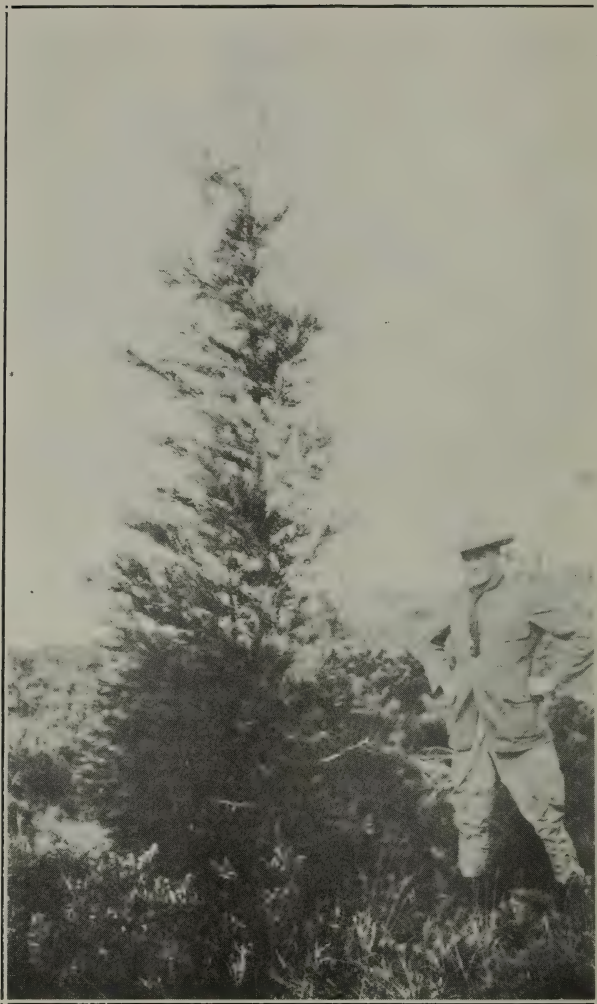


Plate II

Incense cedar (*Libocedrus decurrens*) at 6,500 feet on Haleakala. Planted in 1910, photographed in 1921.

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX.

HONOLULU, JULY, 1922.

No. 7

REPORT ON EXPERIMENTAL FOREST PLANTING AT HIGH ALTITUDES OF MAUI AND HAWAII

BY C. J. KRAEBEL, *Asst. Supt. of Forestry*

In June 1909 there was made the first planting of temperate-zone coniferous trees in an experiment conducted cooperatively by the Territorial Division of Forestry and the Federal Forest Service, with funds set aside by the latter service. In August 1911 the last sowing of seed and the last planting of seedlings concluded the establishment of the experiment. Between these two dates numerous plantings and sowings were made in the selected areas as plants and seeds became available. Since 1911 the only activities directed upon the experiment have been the maintenance of the plot fences during the first few years after establishment, and periodic examinations of the areas until April 1913. A partial examination was made in 1917 by Mr. C. S. Judd. Six progress reports were submitted by Mr. R. S. Hosmer to the District Forester at San Francisco as follows: April 15, 1911—June 2, 1911—February 28, 1912—March 24, 1913—April 1, 1913 (Memorandum)—February 2, 1914 (General summary).

The present statement is therefore the first decade report, since it presents a résumé of conditions ten years after the complete establishment of the experiment. Previous reports were made so shortly after the starting of the experiment that safe conclusions were not possible, but it seems reasonable that a full decade of growth might have produced results which can be useful in guiding any policy of future plantings. Although previous reports have stated the purpose and plan of the experiment it appears advisable to recapitulate briefly these features at this time.

OBJECT

The object of the experiment, as set forth in the working plan prepared by Mr. Ralph S. Hosmer, then Superintendent of Forestry, was "to introduce into the forest flora of the Ter-

ritory of Hawaii valuable timber trees from the temperate zone with the idea of ultimately turning to economic account, through timber production, the upper slopes of the higher mountains of the Territory." Further, the plantings were to be made in areas that were either quite "without forest growth or incapable of being used to advantage for any form of agriculture, including grazing." The experiment was expected to show what species would thrive under the selected conditions, and it was hoped that extensive plantations of the successful species could then be made for the eventual production of commercially valuable timber.

SOURCES OF SEED

The method of securing transplants and seed was outlined in the original plan as follows:

(1) To plant seedlings and transplants obtained direct by mail or express from mainland nurseries; (2) to establish small local nurseries, at as high altitudes as practicable, in order to raise transplant and seedling stock from seed (such stock would have the advantage of acclimatization from the germ stage); (3) to do some direct sowing of seed in small seed spots in each experimental area (This being the least expensive method of afforestation, it was imperative that it be given a trial).

Nurseries were ultimately established, in accordance with this plan, at Ukulele on Maui (4,800 feet) and at Waikii on Hawaii (4,700 feet). Some lots of seedlings were also raised at low-land nurseries at Haiku, Kailili and Waimea.

LOCATION

Sites for the experimental plantations were selected on the upper slopes of the principal mountains, Mount Haleakala on Maui (10,032 feet) and Mauna Kea on Hawaii (13,825 feet). Inasmuch as physical conditions in Hawaii change rapidly with differences in elevation, it was determined to establish several identical plantations at various altitudes. Five acres were taken as the individual plot area.

On Haleakala three plots were laid out on the west slope, at elevations of approximately 7,000, 8,000 and 9,000 feet, and one plot on the northwest slope at approximately 6,500 feet. The last is near a hill called Puu Niania and the others are located along the trail to the summit, all on land belonging to Haleakala Ranch.

On Mauna Kea three plots on the west slope were selected on a broad ridge above Waikii, at the approximate elevations of 7,000, 9,000 and 11,000 feet, the first being near a hill called Puu Luau. A fourth plot with an approximate elevation of 8,000 feet and a northwest exposure was located at Puu Kemole.

All the Mauna Kea plots are on government land within the boundaries of the Mauna Kea Forest Reserve.

SPECIES TESTED

In the following lists are placed the names of the 86 tree species which were experimented with in one form or another. Some were imported as transplants or seedlings from the mainland, many were sown direct in seedpots in the field where they usually failed to establish themselves after germination. The failure of a species on this list should not, however, be regarded as conclusive evidence that the species is worthless in Hawaii; it is often likely that a species which failed in seedspotting might be entirely successful by the transplant method. The attempt was made to work out the history of each shipment of transplants and each seed-lot after they left Honolulu, with a view to determining the source of seed of the most promising species, but after much painstaking study of the records this plan had to be abandoned for lack of continuity.

The asterisk denotes species of which there were living trees growing on one or more of the plots in October 1921. The unmarked species were absolute failures.

SPECIES TESTED—CONIFERS (49)

Abies concolor	Pinus austriaca
“ grandis	“ canariensis
“ lasiocarpa	* “ contorta
“ menziesii	* “ coulteri
“ mertensiana	“ densiflora
“ pectinata	“ divaricata
Casuarina quadrivalvis	“ flexilis
*Cedrus deodara	“ insularis
Chamaecyparis lawsoniana	“ jeffreyi
“ obtusa	“ lambertiana
*Cryptomeria japonica	“ massoniana
*Cupressus arizonica	“ monticola
“ macrocarpa	* “ palustris
“ torulosa	* “ ponderosa
*Juniperus virginiana	“ radiata
Larix europea	“ resinosa
*Libocedrus decurrens	“ sabiniana
*Picea canadensis	* “ strobus
“ engelmanni	* “ sylvestris
* “ excelsa	“ taeda
“ nordmanniana	* Pseudotsuga mucronata
“ parryana	* “ taxifolia
“ sitchensis	Sequoia sempervirens
	“ washingtoniana
	Taxodium distichum
	Thuja plicata

SPECIES TESTED HARDWOODS (37)

<i>Acacia melanoxylon</i>	
<i>Acer campestre</i>	<i>Eucalyptus amygdalina</i>
“ <i>macrophyllum</i>	“ <i>botryoides</i>
“ <i>platanoides</i>	“ <i>citriodora</i>
<i>Buxus sempervirens</i>	“ <i>cornuta</i>
<i>Fagus ferruginea</i>	“ <i>corymbosa</i>
<i>Fraxinus americana</i>	“ <i>corynocalyx</i>
“ <i>viridis</i>	“ <i>delegatensis</i>
<i>Gleditsia triacanthos</i>	“ <i>diversicolor</i>
* <i>Grevillea robusta</i>	* “ <i>globulus</i>
<i>Ilex opaca</i>	“ <i>macrorhyncea</i>
<i>Liquidambar styraciflua</i>	“ <i>obliqua</i>
<i>Liriodendron tulipifera</i>	“ <i>pilularis</i>
<i>Nyssa multiflora</i>	* “ <i>robusta</i>
<i>Platanus occidentalis</i>	* “ <i>rostrata</i>
<i>Quercus rubra</i>	“ <i>rudis</i>
<i>Robinia pseudacacia</i>	“ <i>siderophoa</i>
<i>Sophora japonica</i>	
<i>Syncarpia laurifolia</i>	
<i>Tilia americana</i>	
<i>Ulmus campestre</i>	

RESULTS

Approximately 16,000 coniferous seedlings and transplants of all species were set out in all the plots. Of these there was found growing in October, 1921, a total of 743 or about 4.6%. Of the 70 species of trees, both conifers and hardwoods, which were tried in the seedpots only 173 individual seedlings were alive in October 1921. These striking figures, however, should not be taken at their apparent value, for this is greatly discounted by numerous factors. Many of the species tried were palpably unsuited to the sites; a considerable number of plants were poorly planted; rodents and livestock destroyed entire groups; severe and untimely droughts took heavy toll of tender seedlings; unskilled labor and lack of trained supervision were responsible for still more loss, etc. etc.

Below are presented the record of conditions in October 1921 in each of the eight experimental plots.

TREES GROWING IN OCTOBER 1921

Plot I—Haleakala—6,500 feet

Species	Number	Av. Ht.	In Seeds- Pots
<i>Cedrus deodora</i>	3	4'	..
<i>Cryptomeria japonica</i>	81	4'	..
* <i>Cupressus arizonica</i> .....	..	..	57
<i>Juniperus virginiana</i>	39	3'	..
<i>Libocedrus decurrens</i>	17	8'	78
<i>Picea canadensis</i>	21	5'	..
* <i>Picea excelsa</i>	83	6'	..



Plate III

Group of Coulter pines (*Pinus coulteri*) at 6,500 feet on Haleakala. Planted in 1910,
photographed in 1921.

Species	Number	Av. Ht.	In Seeds- Pots
*Pinus contorta (3 groups).....	13	10'	..
*Pinus coulteri	67	10'	..
Pinus jeffreyi	9	6'	..
Pinus palustris .....	..	..	11
Pinus ponderosa? .....	..	..	24
*Pinus strobus	28	10'	..
Pinus sylvestris	15	6'	..
Pseudotsuga taxifolia	8	28"	..
	384		170

Eucalyptus rudis(33' x 7½" d.)

*Asterisk denotes species which have begun to produce cones.

TREES GROWING IN OCTOBER 1921

Plot II—Haleakala—7,000 feet

Species	Number	Av. Ht.	In Seeds Pots
Cupressus arizonica .....	..	..	60
Juniperus virginiana	1	4'	..
Libocedrus decurrens	2	3'	..
Picea canadensis	2	5'	..
Picea excelsa	4	4'	..
Pinus coulteri	8	10	..
Pinus jeffreyi	3	3'	..
Pinus strobus	5	5'	..
Eucalyptus globulus	3	24'	..
Eucalyptus rostrata	24	9'	..
Eucalyptus sp.	6	10'	..
Grevillea robusta	25	8'	..
	68		

TREES GROWING IN OCTOBER 1921

Plot III—Haleakala—8,000 feet

Species	Number	Av. Ht.
Cupressus arizonica	2	4'
Juniperus virginiana	4	5'
Libocedrus decurrens	8	5'
Picea excelsa	4	5'
Pinus contorta	1	8'
Pinus strobus	7	4'
Eucalyptus globulus	8	20'
Eucalyptus sp.	2	5'
Eucalyptus sp.	4	2'

TREES GROWING IN OCTOBER 1921

Plot IV—Haleakala—9,000 feet

Species (No conifers)	Number	Av. Ht.
<i>Eucalyptus globulus</i>	12	3'
<i>Eucalyptus</i> sp.	2	6'
	<hr/> 14	

TREES GROWING IN AUGUST 1921

Plot I—Mauna Kea—7,000 feet

Species	Number	Av. Ht.
<i>Cedrus deodara</i>	70	8'
<i>Cupressus arizonica</i> (cones)	1	..
<i>Libocedrus decurrens</i>	58	11'
<i>Pinus coulteri</i> (2 bearing cones)	29	14'
<i>Pinus jeffreyi</i>	44	6'
	<hr/> 202	

TREES GROWING IN AUGUST 1921

Plot II—Mauna Kea—9,000 feet

Species	Number	Ht.
<i>Cedrus deodara</i>	16	4'
<i>Libocedrus decurrens</i>	3	4'
<i>Pinus coulteri</i>	14	11'
<i>Pinus jeffreyi</i>	11	10'
<i>Pinus palustris</i>	2	5'
	<hr/> 46	

TREES GROWING IN AUGUST 1921

Plot III—Mauna Kea—11,000 feet

Species	Number	Ht.
<i>Libocedrus decurrens</i>	1	2'

TREES GROWING IN AUGUST 1921

Plot IV—Mauna Kea—8,000 feet

Species	Number	Av. Ht.
<i>Cupressus arizonica</i> (seedspot)	2	*
<i>Eucalyptus robusta</i> (planted)	7	25'

*The two cypresses were mere sprouts from the roots of dead trunks of former trees which had been trampled and killed by cattle and sheep. One twig bore three cones. Might have formed trees if protected from cattle.

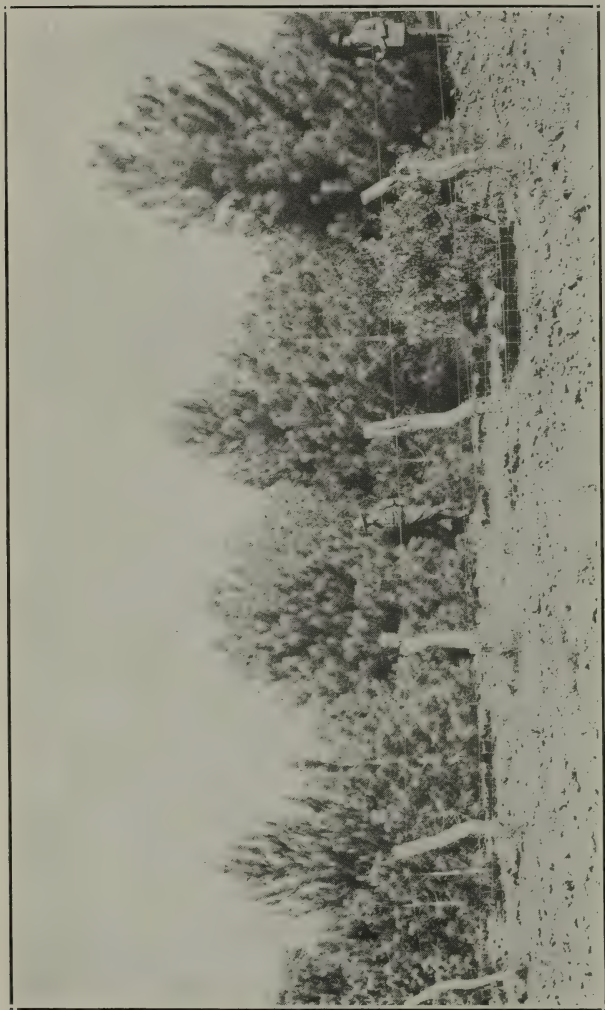


Plate IV

Coulter pine and Jeffrey pine at 7,000 feet on Manna Kea. Smaller trees along fence are Jeffrey pine. Planted in 1910, photographed in 1921.

SUMMARY AND RECOMMENDATIONS

Out of a total of 86 species tested, 19 proved more or less successful, these being divided between conifers and hardwoods, as follows:

Conifers—49 species tried, 15 established.

Hardwoods—37 species tried, 4 established (all Australian species).

It is significant that among the hardwoods none but the Australian species was able to endure the severe site conditions of drought and extreme exposure. The complete failure of the mainland hardwoods dismisses them from further consideration, although it must be remembered that these were all tested in seedspots only, and that if transplants from the mainland had been used some of them might have proven successful.

The following table presents a condensed comparison of the fifteen successful conifers, plot by plot, on the two mountains Haleakala and Mauna Kea. The overwhelming superiority of the Haleakala plots is at once apparent:

	HALEAKALA				MAUNA KEA			
	I	II	III	IV	I	II	III	IV
<i>Cedrus deodara</i>	3	..	..	..	70	16	..	..
<i>Cryp. japonica</i>	81	..	..	..	..	..	..	..
<i>Cup. arizonica</i>	57*	60*	2	..	1	..	..	2
<i>Junip. virginiana</i>	39	1	4	..	..	..	..	..
<i>Liboc. decurrens</i>	17 78*	2	8	..	58	3	1	..
<i>Picea canadensis</i>	21	2	..	..	..	..	..	..
<i>Picea excelsa</i>	83	4	4	..	..	..	..	..
<i>Pinus contorta</i>	13	..	1	..	..	..	..	..
<i>Pinus coulteri</i>	67	8	..	..	29	14	..	..
<i>Pinus jeffreyi</i>	9	3	..	..	44	11	..	..
<i>Pinus palustris</i>	11*	..	..	..	..	2	..	..
<i>Pinus ponderosa</i>	24*	..	..	..	..	..	..	..
<i>Pinus strobus</i>	28	5	7	..	..	..	..	..
<i>Pinus sylvestris</i>	15	..	..	..	..	..	..	..
<i>Pseudotsuga taxif.</i>	8	..	..	..	..	..	..	..
	554	85	27	0	202	46	1	2

*In seedspots.

It will be appreciated at a glance that the lowest altitude plots were most successful. The tendency of future plantings should therefore be to concentrate upon available land at the lower elevations, leaving the upper levels for further experiment in which, perhaps, species better adapted to those altitudes will be found.

From the standpoint of numbers alone it is a simple matter to select the most successful species from the foregoing table. But in selecting the most desirable species for future extensive planting other considerations than mere numbers have weight. Such are the utility or commercial value of the wood, the habit and rate of growth, adaptability to the site, and particularly the reproductive powers of the species. In the present instance Coulter pine has made by far the best growth, has begun producing cones on plots at 7,000 and 8,000 feet elevation and has generally proven itself excellently adapted to the site. Physically it has made the best showing of all the species, and with its vigorous cone production gives promise of becoming self-perpetuating. Yet, because of the low value of its wood for any useful purpose, it can not be given first place in plantations intended for timber production.

After careful consideration of the numerous factors involved, the following is the order in which the twelve best species recommend themselves for future plantings, based upon their behavior in the present experiment:

1. *Pinus strobus*
2. *Pinus coulteri* (as nurse tree, to establish good forest conditions)
3. *Libocedrus decurrens*
4. *Picea excelsa*
5. *Pinus jeffreyi*
6. *Pinus contorta*
7. *Pinus canadensis*
8. *Pinus sylvestris*
9. *Pinus ponderosa*
10. *Juniperus virginiana*
11. *Pseudotsuga taxifolia*
12. *Cedrus deodara*

With regard to the method to be pursued in establishing future plantings it is felt that the local nursery idea is the best. The comparative failure of this method in the present experiment was not the result of the method but of extraneous circumstances which upset the proper procedure. It is, of course, difficult to maintain a nursery at high altitudes, but the chief difficulty seems to be one of personnel rather than site. It is hard to get a reliable nurseryman to live in the remote upper slopes. If the work were to be undertaken on a large scale it would be the best economy to make the inducements sufficiently attractive to keep a good man continuously at the nursery. Seeds could be collected from desirable localities on the mainland, probably by the Federal Forest Service, and propagated in such a nursery at a reasonable distance from the planting site. Topographically the situation on Haleakala and Mauna Kea is better than in many commercial reforestation projects on the mainland.

The degree of success attained in the present experiment, in spite of vicissitudes and many adverse circumstances, demonstrates clearly that the afforestation of the intermediate slopes of Hawaii's mountains is entirely feasible. Moreover, the rate of growth of several of the species tested, and their vigorous appearance in their unhospitable, windswept sites, compares favorably with the growth of similar species in their native habitat on the mainland. The fact that the peerless White Pine (*Pinus strobus*) and Incense Cedar (*Libocedrus decurrens*) stand among the most successful of all the trees experimented with may well be taken as the final convincing testimony in favor of extensive timber-forest planting in Hawaii.



Plate I

White pine (*Pinus strobus*) at 6,500 feet on Haleakala. Planted in 1910, photographed in October, 1921.

Honolulu, June 9, 1922.

HAWAIIAN FORESTS

(By HAROLD L. LYON, Ph.D.)

ORIGIN OF HAWAIIAN FORESTS

These islands have been built up through the activity of volcanoes. The soils on our mountains are entirely of volcanic origin. The native Hawaiian flora has throughout its entire history been called upon to occupy territory built up by recent volcanic eruptions. In fact this was the deciding factor which originally determined what plants should enter into the native flora, for they must have been plants that could invade and establish themselves on volcanic lavas and cinders recently ejected from some volcano. The succession of native plants on these newly created areas has undoubtedly followed much the same course ever since there has been a native flora, the succession of plants on any particular lava flow or cinder-covered area being determined by the climatic conditions surrounding that particular lava flow or cinder waste. On the slopes of Hawaii's active volcanoes are recent lava flows, the ages of which are well known. On these lava flows we may observe the normal succession of Hawaiian plants at the present time. Do we find on these lava flows that the native grasses first occupy any given area, or the lava flow as a whole, and that they are in time followed by native shrubs and eventually by native trees? Do we now find at any point that these lava flows are first occupied by Hilo grass and that this is in time followed by native or introduced shrubs and trees? Not at all! * * * *

The plants that first appear on these lava flows are, almost without exception, native species among which seedlings of native trees predominate. If the lava flow traverses a region subject to a moderate to heavy rainfall, seedlings of ohia trees far exceed in number those of all other species, and a most remarkable feature is the quick appearance of a large number of ohia seedlings at points far removed from fruiting ohia trees. On a lava flow of this sort a forest community of native plants, including trees, shrubs, herbs, ferns, mosses, etc., is built up and thrives without interference from Hilo grass, for the soil conditions are not favorable to this pernicious weed. By studying the flora on lava flows of varying ages on the slopes of Mauna Loa and Mauna Kea one can easily determine that the normal sequence of events in the building up of Hawaiian forests has been much as follows:

Areas recently covered by volcanic ejectamenta are quickly invaded by native species of forest plants, which in the course of a very few years effectually cover those portions having a woodland climate. When these native plants first take possession of a lava flow they occupy the cracks in the *pahoehoe* or the chinks between the blocks of the aa, for in no case is the lava covered by any semblance of soil. As the forest develops a thin layer of soil is created through the decay of leaves and other debris falling from the plants, which mingles with the fine material formed by the slow decay of the superficial lava. In the course of time considerable soil is built up, being constantly added to from above and below. Trees and shrubs mature and die and their bodies are added to the soil, so that eventually the still solid portions of the lava are covered by a soil of considerable depth, the particles of which filter down into, and effectually clog the interstices in the rocks below. Ohia trees will not root deeply in a water-logged soil. Their roots will follow the cracks and crevices in a lava flow to great depth, so long as these cracks and crevices are drained, but let their free drainage be stopped and no ohia roots will enter. The first stand of trees on a lava flow send their

roots down into the cracks of the lava, and as soon as the hard surface is covered with a thin layer of soil they also spread out their roots in this thin covering. When the second and successive growths of trees start in this forest the cracks in the lava are as a rule already stopped up with fine material, and consequently second and subsequent growths spread out all of their roots in the surface soil. In a heavy rain-forest it will be found that the native trees, particularly ohia, are very shallow-rooted; in fact, the upper surfaces of all of their roots are only covered by a thin layer of decaying leaves and twigs, which are in turn well shaded by the close growth of native herbs, ferns and shrubs which normally cover the forest floor.

HAWAIIAN TREES SENSITIVE TO NEW CONDITIONS IMPOSED UPON THEM

Prior to the coming of the white man and his domestic animals, the native forest was not subject to invasion by hard-footed and foliage-destroying animals. The thinly veiled roots of the native trees in the forests on the older lands were not subjected to disturbance or exposure through the interference of man or animal. When the white man invaded these islands and began to exploit them in various ways he soon introduced adverse elements new to the experience of Hawaiian forest trees and against which they had evolved no protection. It is a fact too well known to require detailed discussion here that to kill the trees in any old Hawaiian forest it is only necessary to remove for a short time the natural undergrowth from the forest floor. If in addition the thin layer of organic debris which covers the roots of the trees is seriously disturbed, the death of the trees is further hastened.

In the course of ten years we have seen a large area of dense native forest in the lands of Kehena on the Kohala mountains killed out almost to the last tree by the invasion of stock which destroyed all of the undergrowth and trampled on the roots of the trees. Many specific examples might be cited to illustrate the extreme delicacy of Hawaiian forests and their acute sensitiveness to the slightest physical interference, particularly if that interference entails a disturbance of the plants and soil above their roots. The construction of a road, trail or irrigation ditch through a native forest is almost invariably followed by the death of a considerable number of the trees along the line of disturbance, the extent of the destruction depending upon the violence of the disturbance and the length of time through which it is continued.

If you look down into Kahana Valley from the ridge of the Koolau Mountains you will see a brown swath of dead trees winding through the forest in the upper portion of this valley. This swath of dead trees marks the course of the irrigation ditch constructed in recent years across this valley. If you will look back on the lower rim of Kaau Crater from the top of Olympus you will see a broad band of dead trees which marks the course of a portion of the trail covered by Rule V.

CLOSING OF TRAILS BY VEGETATION

During the past year we have found and followed an ancient trail through the Hilo forest which has been entirely covered over and obliterated by native vegetation. At the present time it is only possible to pick out the course of this trail by unearthing fern logs at certain points which paved the trail, by noting ancient blaze marks on the trees and the passageways which were cut through large fallen tree trunks. Last summer, in surveying the Hilo Forest Reserve boundaries, it was necessary at certain points to cut trails through the edge of the native forest. These surveying trails were immediately abandoned after the passing of the surveying party and in the course of a few months were

at many points effectually covered over and obliterated by native plants. If the ancient trail mentioned above was entirely obliterated by native vegetation, and these recent surveying trails have likewise been quickly overgrown by native vegetation, why will not the native vegetation obliterate in the same way any trail through the native forest if this trail is not kept open by the hand of man? All available evidence indicates that the native plants will accomplish this result provided that the opening made to accommodate the trail has not become occupied by some rank-growing introduced plant which can hold the ground against the native vegetation.

Of the introduced plants which can successfully hold off the native vegetation when once they become established in a trail, Hilo Grass is by far the most serious even as it is the most frequent offender. To reach any trail leading through our forest it is necessary to pass through growths of Hilo grass. The fruits of this grass are adhesive and designed for distribution by adhering to the bodies of passing animals. Consequently any trail opened in the forest is liable to infection by Hilo grass throughout its entire length, the speed with which infection will take place at various points along the trail depending upon the number of people using the trail and the frequency of their trips over the trail. If a trail is opened up and used for a brief period only and then abandoned it will probably be closed up by the native plants much as the trails have been along the makai boundary of the Hilo Forest Reserve, but the longer the trail is kept open and the more it is used the more extensive will be the infection by Hilo grass and the chances of a natural closing of the trail at any point will diminish as the infection increases.

HILO GRASS SPREADS FROM TRAIL TO FOREST

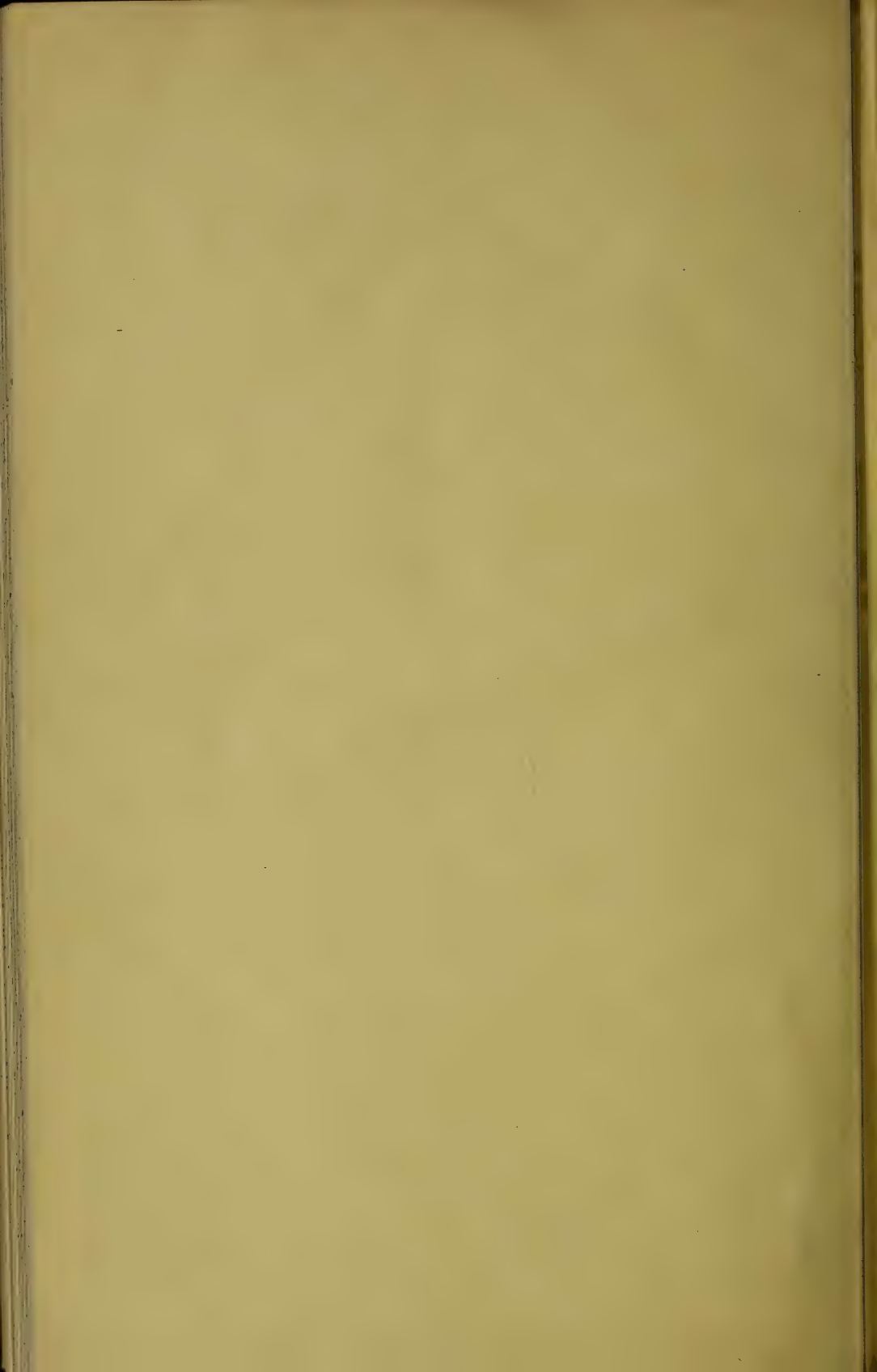
When Hilo grass has once become established in an opening in our native forest it not only successfully holds the ground occupied but makes it a base from which it keeps up a constant and successful pressure against the surrounding vegetation. The rapidity of its progress will depend upon the density of the native vegetation with which it has to contend. Its method of procedure is to encroach upon the undergrowth, eliminating the smaller plants by overtopping them, and preventing the reproduction of the larger plants by smothering out their seedlings. The existing generation of shrubs may survive for a considerable time but the grass prevents the growth of seedlings of the same species to succeed them when they finally succumb. The Hilo grass exerts a deleterious influence upon the taller growing shrubs and the ohia trees for when it has replaced the low-growing ferns and tender herbaceous plants which normally cover the forest floor and its roots have permeated the thin layer of soil and organic matter which cover the roots of the trees and shrubs, these plants show signs of distress and soon weaken and die. As pointed out above, the presence of Hilo grass beneath these trees effectually prevents the growth of seedlings of the native plants and the ultimate result is that the forest is replaced by grassland.

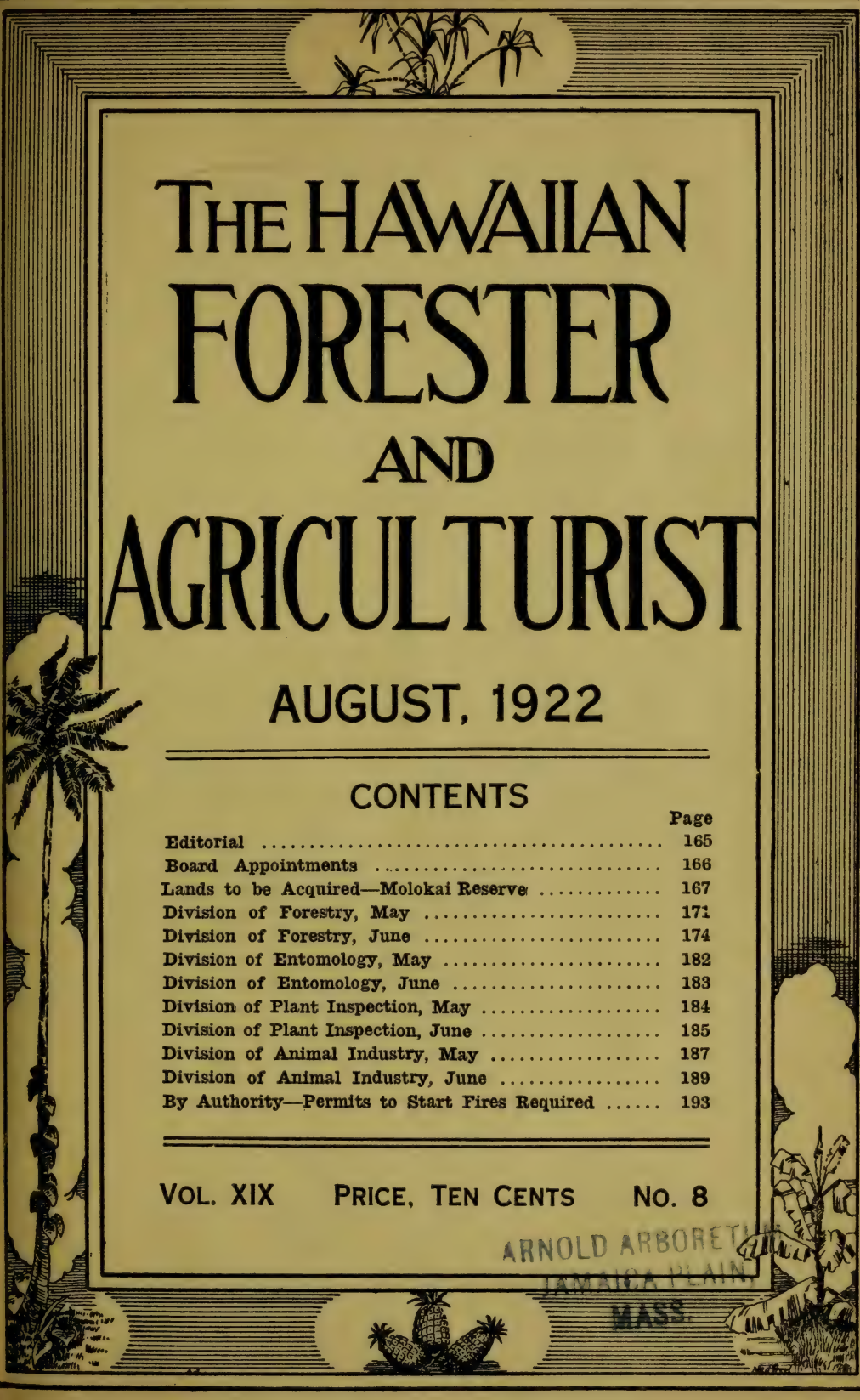
On the slopes of the mountain range back of Manoa Valley is a steep watershed not over a mile wide at any point. The native plants have not been able to create as dense a cover on the very abrupt slopes of this watershed as they do on the gentler slopes and consequently the resistance of this forest to Hilo grass is below the normal. It has long been evident that the native forest is yielding rapidly at many points before the solid ranks of Hilo grass which are pressing in upon it from all sides, yet the Government has permitted the construction of an artificial trail throughout the length of this watershed and has for many

years and still is at the present time permitting pedestrians to traverse this trail at will. Hilo grass infections have been established at all points along this trail where the disturbance has been sufficient to create an opening large enough to enable it to gain a foothold. Further use of this trail will create additional spaces to accommodate Hilo grass and assure its establishment in these places. If this trail is closed there is still a possibility that it will be overgrown at many points by native vegetation. It should not only be closed to pedestrians but steps should at once be taken to eradicate it as an opening through the forest by the planting of suitable trees and shrubs.

SUMMARY

1. In regions of suitable climate, Hawaiian forests have taken direct possession of new volcanic areas and held these continuously up to the present time.
2. Ohia trees which constitute the predominating element in Hawaiian rain-forests root deeply only in such soils as have good subterranean drainage. In water-logged soils ohia trees produce superficial roots only, these being covered by a thin layer of organic debris and further protected by the shrubs, ferns, etc. which normally cover the forest floor.
3. The destruction of the undergrowth in an Hawaiian rain-forest is followed by the death of the ohia trees because of the exposure and disturbance of their roots.
4. The native Hawaiian flora did not contain any strong-growing grass that built up a perennial grassland which stood opposed to the woodland.
5. Hilo grass is a plant-immigrant which reached these islands less than ninety years ago. It is a coarse, strong-growing and freely-seeding grass producing a continuous mat over the surface of the soil.
6. With the introduction of Hilo grass the native forest was at once confronted by an adversary with which it had never been compelled to compete and against which it had naturally evolved no defense.
7. Operating from an established base Hilo grass encroaches upon the undergrowth in the forest, eliminating the smaller plants by overtopping them and preventing the reproduction of the larger plants by smothering out their seedlings.
8. Hilo grass exerts a deleterious influence upon the taller growing shrubs and the ohia trees for when it has replaced the low-growing ferns and tender herbaceous plants which normally cover the forest floor and its roots have permeated the thin layer of soil and organic matter which cover the roots of the trees and shrubs these plants show signs of distress and soon weaken and die.
9. Any openings created in our forest will eventually become infested with Hilo grass if they remain open a sufficient length of time.
10. The closing of any opening in the forest by native vegetation will take place if the native vegetation can cover the area before Hilo grass gains a foothold therein.
11. When Hilo grass has once become established in an opening in our native forest it not only successfully holds the ground occupied but makes it a base from which it keeps up a constant and successful pressure against the surrounding vegetation.
12. Hilo grass produces adhesive seeds which are designed for distribution by adhering to migrating animals.
13. All trails leading from the lowlands to and through Hawaiian forests traverse areas already infested with Hilo grass.
14. All trails through Hawaiian forests are avenues along which Hilo grass infection is carried to the interior of our forests.





THE HAWAIIAN FORESTER AND AGRICULTURIST

AUGUST, 1922

CONTENTS

	Page
Editorial	165
Board Appointments	166
Lands to be Acquired—Molokai Reserve	167
Division of Forestry, May	171
Division of Forestry, June	174
Division of Entomology, May	182
Division of Entomology, June	183
Division of Plant Inspection, May	184
Division of Plant Inspection, June	185
Division of Animal Industry, May	187
Division of Animal Industry, June	189
By Authority—Permits to Start Fires Required	193

VOL. XIX

PRICE, TEN CENTS

No. 8

ARNOLD ARBORETUM
JAMAICA PLAIN,
MASS.

The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy ; \$1.00 a year ; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,
H. M. von Holt,

W. M. Giffard,
A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

J. P. Pico, *Forest Ranger for Waiahae-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss Helen Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX.

HONOLULU, AUGUST, 1922.

No. 8

An agreement has been approved by the Board whereby 20 acres of land on Round Top will be planted up to Macadamia nut trees.

During June the fencing of forest reserve boundaries progressed to the extent of 4.79 miles of new fences constructed and 1.24 miles of fences repaired.

During May 570 more trees were added to the chaulmoogra plantation established at Waiahole, Oahu for the production of the valuable oil.

A special report on the desirability of securing title to certain lands within the boundary of the Molokai Forest Reserve is printed in this issue.

The Board has turned back to the Land Commissioner the parcel of land of the north bank of the Wailoa River in Hilo covered by Executive Order No. 55, and which was formerly used by the Division of Plant Inspection.

The Division of Forestry plans to complete arrangements this summer for fencing the entire makai boundary of the Hilo Forest Reserve on Hawaii wherever the forest is exposed to damage by stock.

damage by stock by suitable fencing for the past 23 years, the native forest is renewing itself naturally and in another ten years will furnish a cover that will be satisfactory for water conservation purposes. This process should be hastened, however, by artificial tree planting.

To accomplish the above, and to put a permanent end to the grazing of stock on the land it will, in my opinion, be necessary for the Territory to own the land.

THE KAHANUI REGION

Approximately three miles southeast of the above-described region, in the heart of the wet forest between the government land of Kalamaula in the forest reserve and Waikolu Valley is the land of Kahanui contained in Grant 3,437 to R. W. Meyer comprising 1,048.00 acres. I am informed that when Mr. Meyer first put cattle on this land he had to cut roads through a heavy native forest jungle in order to drive the cattle into this mountain pasture. The inevitable result has followed here—the conversion of a water conserving forest to a Hilo grass area dotted with dead trees.

A forest cover is very necessary here in order to conserve the headwaters of the Waihanau Stream which originate on this land and the waters of which the Hawaiian Homes Commission needs and is planning to use in the development of farms on the lowland. Cattle grazing on the watershed is a detriment and the land should be owned by the government, all cattle removed and kept off, and the land reforested either artificially or naturally.

PREVIOUS REPORT

When the reserve was made, ten years ago, the desirability of acquiring title to these lands, as being the only means of terminating their use for grazing and of bringing back a much-needed forest on the land was felt and was expressed by my predecessor in the following excerpt from his report of July 25, 1912, on the Molokai Forest Reserve:

"With the exception of the Meyers' lands, practically all the areas included within the reserve are now under forest or in process of being forested. * * *The Meyers' lands, on the contrary are now used regularly for grazing, and it is the intention of the owners to continue so to use them. The larger part of the Meyers' lands within the forest reserve limits are now open.

"In my judgment it would be for the best interests of the island as a whole were these particular lands again got under forest, more especially the portion of Kahanui bordering the great Waikolu Gulch, through which land run the small

gulches that unite to form the Waihanau Gulch that comes out above the Leper Settlement on the land of Makanalua.

"From a water supply standpoint this is a highly important portion of Molokai, because while the area is small, only about one mile square, it is subject to heavy rainfall, while from its location the Waihanau is a stream that could readily be diverted and put to use. Speaking of this stream, the Waihanau, Lindgren says: 'Swamps line the borders and much water comes in from springs on the sides of the abrupt canyon in which it flows. * * * I conclude that the stream can be relied on for 3,250,000 gallons per 24 hours from November 1 to June 1, for 1,000,000 gallons during June and July, and for at least 100,000 gallons from August 1 to November 1.'

"When water is as badly needed and as valuable as it is on Molokai, it is not good policy to use such an important catchment area as this for grazing. On a good portion of upper Kahanui the native forest would probably come back naturally if cattle were excluded. Lower down artificial planting would be necessary. On the lower portion of Kahanui mauka, but still within the line of the proposed reserve, are 'Meyer's Lake' and one or two other possible reservoir sites.

"Theoretically, the proper thing would be for the Territorial Government to take over this land, at a fair valuation, but practically there is no fund available for making such purchases. Owing to complications resulting from the fact that the Meyers' lands are parts of the undivided estate of the late R. W. Meyer, under the terms of a will which provides that the estate cannot be finally settled during a term that has yet many years to run, it would not be easy to effect a transfer of title. But possibly in time, were a Molokai water company formed, it might be possible through a long lease to control the lands for a sufficient time to make it pay to get a new forest started. In the meantime the fact that a forest reserve line has been drawn across it on the map as a guide for future action, does not affect the Meyer Brothers in practice if they see fit to continue to use their lands for grazing."

CONDITIONS TODAY

The same conditions and situation, which existed ten years ago are found today but some of them to a greater or more intense degree. The destruction of the forest on these lands has progressed and is still going on by reason of continued cattle grazing; there is now definite need for every drop of water which these lands may produce by reason of the development of homes for Hawaiians, more particularly the water in Waihanau Gulch; and the Territory is just as badly off today for funds for the purchase of these lands.

DESIRED ACTION

It is my desire, however, to record at this time the necessity of getting all of the cattle off these lands, of keeping them off, and of reforesting the lands by natural reproduction assisted, where necessary, by artificial planting, so that there will be established at the earliest practicable date a forest cover which will conserve the water in the streams and make their flow as continuous and as abundant as possible.

It is believed that the only way in which this may be accomplished satisfactorily is for the Territory to acquire and own the land and to proceed as outlined above.

RECOMMENDATIONS

For the above reasons, it is recommended that, at the earliest feasible date, steps be taken to acquire the privately-owned lands within the Molokai Forest Reserve hereinbefore described and amounting to 1,607.40 acres either by condemnation proceedings in the usual manner, whereby the Meyer family will be justly compensated, or by an equitable exchange (to be specially authorized by Act of Congress) and that, with this in view, this report be accepted and forwarded to the Governor of Hawaii with the request that it be referred to the proper official for action.

Honolulu, May 15, 1922.

TERRITORY OF HAWAII
EXECUTIVE CHAMBER
HONOLULU

June 26, 1922.

Honorable C. S. Judd,

Executive Officer, Board of Agriculture and Forestry,
Honolulu, Hawaii.

Dear Sir:

I have received and read with interest yours of June 16th with its enclosed report on the lands to be acquired within the Molokai Forest Reserve.

I have been over some of these lands which can be referred to as the worst from the standpoint of being an exhibit in forest destruction.

I am quite in sympathy with your suggestion to secure control of the 1,607 acres owned by the Meyer family.

I will study the situation to see what can be done and will appreciate at all times suggestions that may occur to the members of your Board on ways and means for securing the land.

Yours very truly,
W. R. FARRINGTON,
Governor of Hawaii.

HAWAIIAN HOMES COMMISSION
EXECUTIVE BUILDING
HONOLULU

June 19, 1922.

Mr. C. S. Judd,
Superintendent of Forestry,
Honolulu, T. H.

Dear Sir:

The Hawaiian Homes Commission acknowledges receipt of your report on lands to be acquired in the Molokai Forest Reserve. This report is of great interest to the Commission as they are undertaking settlement work on Molokai and the carrying out of your recommendations will greatly assist in the work the Homes Commission is undertaking.

Yours very truly,
GEO. P. COOKE,
Executive Officer & Secretary.

DIVISION OF FORESTRY

REPORT OF SUPERINTENDENT OF FORESTRY, MAY, 1922

July 5, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of May, 1922:

FOREST PLANTING

During May 7,148 trees were planted out on five different forest reserves on Kauai, Oahu, and Hawaii as follows:

Kauai:

Lihue-Koloa Reserve at Kalaheo—silk oak 235

Oahu:

Honolulu Watershed Reserve at Tantalus—koa 40

Honolulu Watershed Reserve at Makiki—koa 72

Waiahole Reserve at Waiahole—Moreton Bay fig..... 30

Waiahole Reserve at Waiahole—koa 410

Waiahole Reserve at Waiahole—chaulmoogra (*Hydnocarpus anthelminticus*) 570

Waiahole Reserve at Waiahole—blackbutt (*E. pilularis*) 115

Waiahole Reserve at Waiahole—*Gynocardia odorata* 383

Lualualei Reserve at Mikilua—logwood 877

Hawaii:

Hilo Forest Reserve at Honomu— <i>Ficus rubiginosa</i>	200
Hilo Forest Reserve at Honomu— <i>Ficus calophylloides</i>	100
Hilo Forest Reserve at Honomu— <i>Ficus ulmifolia</i>	100
Hilo Forest Reserve at Honomu— <i>Ficus nota</i>	100
Hilo Forest Reserve at Honomu— <i>Ficus forstenii</i>	100
Hilo Forest Reserve at Kaupakuea— <i>Ficus rubiginosa</i>	2,216
Hilo Forest Reserve at Kaupakuea— <i>Ficus calophylloides</i>	400
Hilo Forest Reserve at Kaupakuea— <i>Ficus ulmifolia</i>	400
Hilo Forest Reserve at Kaupakuea— <i>Ficus nota</i>	400
Hilo Forest Reserve at Kaupakuea— <i>Ficus forstenii</i>	400

Total number of trees planted7,148

MACADAMIA PLANTING AGREEMENT

The agreement with Mr. E. S. Van Tassel for the planting of 20 acres of land in the Round Top Forest Reserve with macadamia nut trees, which was authorized by the Board on May 11, 1922, was executed on May 11, and the squatters who were using the land temporarily have been notified to move off before the tree planting begins in the fall.

SEED FROM NEW ZEALAND

On May 8, Mr. James Munro brought in from New Zealand and donated to the Division of Forestry for propagation the following seed, most of which are from valuable timber trees:

Miro	<i>Podocarpus ferrugineus</i>
Matai	<i>Podocarpus spicatus</i>
Totara	<i>Podocarpus totara</i>
Kahikatea	<i>Podocarpus dacrydioides</i>
Pouriri	<i>Vitex lucens</i>
Kohai	<i>Sophora tetraptera</i>
Tawa	<i>Beilschmiedia tawa</i>
Spiderwood	<i>Dracophyllum latifolium</i>
Kauri	<i>Agathis australis</i>

On May 4, a request was sent to the Department of Agriculture in Washington, D. C. for some seeds of the *Olneya Tesota*, a bean tree of Arizona which has good forage value and which, it is felt, will be an addition to our flora.

FOREST FENCING

Progress is being made in the fencing on the Hilo Forest Boundary and work was started during the month on several new sections of the line so it is hoped that it will be possible to fence all boundaries crossing governmental lands during the summer while good weather prevails. In Olaa two homesteaders are building fences, in cooperation with this Division, which will protect 3.80 miles of forest boundary. Mr. Herbert C. Shipman has agreed to rebuild the fence for a distance of 2.75 miles, protecting the forest reserve strips on the west side of the Volcano Road in Olaa from 19½ to 22 Miles, this Division furnishing the wire. Ranger Mackenzie repaired .75 mile of fence on the boundaries of Section A of the Olaa Forest Park Reserve, Hawaii, and at Kuliouou, Oahu a short stretch of fence .07 mile long was constructed by Ranger Ellis to prevent cattle from getting around the old fence into the forest reserve.

RULE V

Rule V which gives added protection to the forest on the steep mountain slopes at the head of Palolo and Manoa Valleys was signed by the Governor on May 13, published on May 16, and went immediately into effect. Wooden painted signs have been placed at all points entering the forbidden area of 1480 acres and on the main trails obstacles to pedestrian travel have been erected and the men of the Division have done extra duty on Sundays to see that the area is not entered.

LANDS IN MOLOKAI RESERVE

During the month I completed a report on 1,607.40 acres of privately owned lands in the Molokai Forest Reserve which are being used for grazing to the detriment of the water supply and which it is very desirable for the Territory to acquire. This has already been placed in your hand and accepted and has been forwarded to the Governor.

FOREST MAPS

The maps and descriptions of the changes in the Hilo Forest Reserve, the addition to the Upper Waiakea Reserve, and the new Waiakea Reserve have been corrected and added to and will shortly be in shape for your consideration. Because of the necessity of pushing the urgent fencing work on Hawaii during the dry months, the report writing and holding of the necessary hearing will have to be delayed a few months.

MAUI TRIP

From May 15 to 25, I was on the Island of Maui making a general inspection of fences on forest reserve boundaries. Some on the boundaries of leased land were found to be in need of attention and have been reported to the Land Commissioner. Others were found to be in good shape.

In company with the Land Commissioner I went over the government land of Kahikinui and with him decided upon a line below which a new grazing lease will be made and above which it is desirable to keep and protect as a forest reserve. On parts of this section comprising about 12,000 acres there are good stands of *mamani* trees which will increase if cattle are kept out and on others the quantities of dead trees indicate a former rather heavy forest. Any forest growth which may influence precipitation advantageously will be of great benefit in this region where water is very scarce. As soon as a fence is built on this chosen line, it is proposed to recommend that the land above it be set apart as a forest reserve.

On May 22 while passing along the Nahiku ditch between Makapipi Gulch and Hanawi Stream and at Kapaula near the Nahiku Ditch Camp I discovered that some of the *amaumau* ferns were infested with the fern weevil. The manager of the East Maui Irrigation Company was immediately informed and he has had the infested patches burned. Since then the weevil has been found over a large area and it has been decided to control the infestation by sending up a colony of parasites for liberation.

VEGETABLE SEED

During the month 69 mail bags of vegetable seed and two bags of flower seed were received from our Delegate to Congress. Notice of the arrival of the seed was advertised and it is being rapidly distributed throughout the Territory.

Respectfully submitted,

C. S. JUDD,

Superintendent of Forestry.

REPORT OF SUPERINTENDENT OF FORESTRY, JUNE, 1922

August 14, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I respectfully submit the following report of the Division of Forestry for the month of June, 1922:

TREE PLANTING

During the month a total of 2,258 trees was planted as follows:

Oahu:

Honolulu Watershed Reserve at Makiki—koa 517
Lualualei Forest Reserve at Mikilua—Moreton Bay fig 1,001

Hawaii:

Olaa Forest Park Reserve, Sec. C. at Lot 181—lemon gum 40
Hilo Forest Reserve at Honomu—Port Jackson fig 700

Total number of trees planted 2,258

PLANTING PLAN

At the request of President Atkinson I prepared during the month and began the execution of a plan for planting up the piece of land controlled by the War Department opposite Piers 8 and 9 on the waterfront in Honolulu and between Bishop and Kekuanaoa Streets. The army authorities have removed the coal pile which used to occupy this lot and have filled in the low places with good soil. The plan provides for the informal group planting of coconut trees with a few Port Jackson fig trees (*Ficus rubiginosa*) to hide the buildings at the mauka side of the lot and to provide dense shade. The work of planting the trees is being done entirely by the transportation department of the army.

FENCING

During June the following fence work amounting to 6.03 miles was accomplished on forest reserve boundaries:

Fences Completed

Hawaii:

Hilo Forest Reserve, Punahoa 2-Piionua47 miles
Hilo Forest Reserve, Punahoa 2-Piihonua47 miles
Hilo Forest Reserve, Opea-Peleau, Lots 16-1747 miles
Hilo Forest Reserve, Kaiwiki III, Lot 2243 miles
Hilo Forest Reserve, Piha, Lots 1-402 miles
Olaa Forest Park Reserve, Sec. C, Lot 212..... .23 miles
Mauna Kea Reserve, Kaohe 6, Kukaiau & Kaholalele 2.88 miles

Oahu:

Honolulu Watershed Reserve, Palolo and Nuuanu07 miles

Total length of new fences 4.79 miles

Fences Repaired

Kauai:

Moloaa Forest Reserve, Ranger Lovell18 miles

Oahu:

Lualualei Forest Reserve, laborers06 miles
Kuliouou Forest Reserve, Ranger Ellis46 miles

Hawaii:

Olaa Forest Park Reserve, Sec. C., Ranger Mackenzie... .54 miles

Total length of fences repaired 1.24 miles

Inspections were made on Oahu of the fences at Kuliouou and Waiahole and repairs made on the first fence.

The fences built during the month on the Honolulu Watershed Forest Reserve consisted of a board fence barricade across the trail on the Nuuanu slope of Kaumuhono peak and barbed wire stretches across the trails on the Manoa-Palolo ridge, and on the middle ridge and in Waia-mao Valley in Palolo Valley. These were necessary for the enforcement of Rule V which prohibits tramping on the Palolo-Manoa Drain-age Reservation.

Further details in connection with the fencing along the Hilo Forest Reserve boundary and the removal of cattle from that reserve are contained in the current report of the Assistant Superintendent of Forestry.

NEW FOREST RESERVE LAND

In the course of an inspection trip on June 8, to Kealia, Kuaokala, and Keawaula in the Waialua and Waianae Districts on Oahu with a fence foreman to show him where certain new fences are to be built and with the Surveyor of the Territory to point out to him certain discrepancies in surveys, I came across an area of about 20 acres at the head of Kaluakauila gulch which drains into Keawaula and contains an excellent stand of kukui and other native forest trees. By a too general description this area was not originally included in the Kuaokala Forest Reserve. It can be protected from damage by stock by a small amount of fencing and as soon as a survey of it can be made I shall recommend that it be added to the above reserve.

FOREST FIRES

The following two forest fires were reported during June:

June 28, 1922, Waianae-uku, Oahu. District Fire Warden A. A. Wilson reports a fire on the Schofield Barracks military reservation on the slopes of Kaala mountain between Maili point and Kolekole pass which started from artillery practice. After it was put out by the army the same day, it sprang up again on the next. An area of about 75 acres was burned over, of which about 10 acres was covered with trees and the balance with grass.

June 29, 1922, Halehaku, Maui. District Fire Warden W. F. Pogue reports that a fire was started at noon by some children who had gone with their mother to work in a garden patch. They were too upset to put it out and were found crying by Mr. Fred Wilhelm who promptly secured some men and with their assistance extinguished the fire the same day after it had burned over only about 8 acres.

On June 19, I warned two Japanese, who had been sent in to me by the District Fire Warden and who had the day before started two fires to clear brush at Kunia, Oahu, without first taking proper precautions, not to start any more fires without first securing a permit. On June 21, I began the publication of a warning requiring, until further notice, permits to start fires to clear land in the Ewa and Waialua Districts on Oahu.

HAWAII TRIP

In order to take advantage of the favorable weather for fence building on the boundary of the Hilo Reserve and in Olaa I left Honolulu for Hawaii on June 20, going first to Puuwaawaa at the earnest solicitation of Hon. Robert Hind, to attend the drive of wild goats on his ranch. Although the 100 enlisted men from the regular army, requested of the Commanding General through the Governor, were not forthcoming, eleven marines from Pearl Harbor volunteered and went up with me and were of assistance during the drive and before it by shooting 100 wild sheep. The drive which covered approximately 17,000 acres was

held on June 26 and 27 and the bulk of the drivers were boy scouts from Hawaii, numbering 176 with 14 officials. On the driving line there were about 225 individuals in all. Extremely rough country was encountered and many hardships were experienced but the work of the scouts and others resulted in driving over 7,000 goats on to the sand spit at the ocean near Kiholo where they were slaughtered.

The experience of this drive has enabled me to make an estimate of the wild goat population of the Islands and of the approximate cost of getting rid of them. It is estimated that in the regions of Hawaii and Maui infested by wild goats there is approximately one goat for every 2.5 acres of land or a total goat population of 100,000 on Hawaii and 8,000 on Maui which should be exterminated if the grass and forest cover are to be saved. Although it cost only approximately 11 cents for each of the goats driven in at Kiholo with the aid of volunteers, it would cost approximately 43 cents each with hired labor. This would require about \$50,000 to rid these two islands of wild goats. On the remaining islands the goats do not at present constitute such a menace.

A full report on this subject embodying recommendations for legislative action is submitted under separate cover for your consideration.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY, MAY, 1922

June 9, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following statement of my activities during May, 1922, is respectfully submitted.

With the exception of two short field trips on Oahu, the entire month was spent upon routine matters in the Honolulu office.

KAILUA IRONWOOD FOREST

On May 9, I accompanied officials of the Kaneohe Ranch on a visit to Mokapu Peninsula to advise upon the thinning of the Kailua ironwood plantation. The matter is formally summarized in my letter of May 11, to Mr. H. L. Castle.

RULE FIVE

Considerable time was devoted during the month to administrative work in connection with the enforcement of Rule Five which was approved by the Governor on May 13, with the enjoinder that absolute enforcement was expected. The Tourist Bureau was informed of the rule and requested to have the references to tramping in the forbidden area deleted from its folders. Kapu signs were prepared for placement across all trails leading into the area and the rangers were instructed with special regard to enforcement of the rule. One day was spent with the Superintendent, Ranger Ellis and laborers upon the construction of an unscalable barrier across the trail leading to Puu Konahuanui.

MAPS

A total of several days was given to the compilation of data from the Hilo Forest Reserve map and to the checking of alterations being made upon it by the Survey Office.

Respectfully Submitted,

C. J. KRAEBEL,
Assistant Superintendent of Forestry.

**REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY,
JUNE, 1922**

Hilo, Hawaii, July 24, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following statement of my activities during June, 1922, is respectfully submitted:

The first week of June was devoted to a report on the experimental forest plantings at high altitudes on Maui and Hawaii which were established from 1909 to 1911 under the direction of Mr. R. S. Hosmer. This report was completed on June 8, and will be printed in an early issue of the "Forester."

On June 10, I left Honolulu for Hawaii to push the numerous projects of required fencing along the makai boundary of the Hilo Forest Reserve. The projects given attention up to the end of the month are as follows:

Punahoa 2nd. John Ventura, lessee of land adjacent to the government land of Piihonua in the Hilo Forest Reserve, is required to build 5,188 feet of fence on this boundary, the wire having been supplied by the Division of Forestry. I inspected this work during construction and rejected many posts as being too small. This fence will be completed early in July. The mauka line of Ventura's lease, 1,327 feet, adjacent to private land in the Reserve, has been cleared and posts are cut but not set; to be completed during July. Along the east bank of Kahoama Stream Mr. Ventura will have to build a fence of some 300 feet to join a fence of the Hawaii Mill Company.

During this inspection many cattle belonging to the Andrade-Mattos family of Hilo were found in trespass in the Hilo Forest Reserve and adjacent private lands. A formal letter of notification to remove the cattle from the Forest Reserve within ten days was delivered in person on June 14, to August Andrade Mattos, senior son of the family and principal owner of the cattle. At a subsequent interview the time limit was extended to July 1st, at the request of Mr. Mattos. These cattle have run wild in Piihonua for so many years that it is practically impossible to drive them out and it is certain that a final remnant of them will have to be hunted and shot. The situation in this vicinity can be appreciated from the fact that the Mattos family, which controls 50 acres of grazing land in Punahoa and 75 acres in Ponahawai, nevertheless grazes about 130 head of stock. About 3 acres of land are required in this region to support one adult animal under continuous grazing. The inference is plain that the Forest Reserves and adjacent private lands (over which the owners of these cattle have no control and for which they have neither paid rental nor received any sort of use-permit) have been deliberately and criminally exploited.

This case is set forth in detail because it is only typical of what is occurring in several places along the boundaries of the forest reserves, and particularly along the makai boundary of the Hilo Reserve. It is

furthermore presented as evidence that a vigorous and literal enforcement of the ten-day notification law is necessary in order to establish a respect for the forest boundaries and a compliance with the forest laws.

Steps have been taken to encourage the Mattos family to secure leases or formal permits to use a considerable acreage of private land adjacent to their present holdings in order further to reduce the temptation to trespass upon the Hilo Forest Reserve. As a final move the Hilo and Olaa Sugar Companies will be requested to proceed with the fencing of their portions of the Reserve, aggregating a total distance of about 8,700 feet, and thus close the entire south boundary against cattle. This also should be completed during July.

Piihonua. Mr. Henderson has been unable to begin construction of the fence between Hookelekele and Aale Streams because of the wash-out of the bridge above Piihonua village. He questioned whether he would be required to fence that portion of the line lying south of Kapehu Gulch, provided the cattle were removed from that area and confined to the area north of the gulch.

Kaiwiki (old). The presence, in the private lands of Alae and Kalalau within the Reserve, of cattle strayed from the Kaiwiki Homesteads makes it imperative that adequate fences be built by the owners of private lands along the south sides of Lots 67, 66, 52, 50, 48 and 46. Further investigation of this situation is necessary before action can be taken.

Kaupakuea, Lot 1. This lot is owned by a Hawaiian woman, Pili-lua Kapule, and is used as a pasture by John Souza, of Pepeekeo, whose cattle had been grazing in trespass on Puu Kauku for many years. I condemned the fence which he had lately built on the forest side of this lot, and sent him wire to construct a standard fence. This fence, totaling 650 feet, will be completed early in July.

Honoumu, Lot 17. Owned by Honomu Sugar Company and grazing permit held by Victorino Carrera of Honoumu. The fence built on the mauka boundary of this lot, with government wire, was found to be altogether unsatisfactory. Mr. Carrera was notified to rebuild the fence on the true boundary, to do more clearing, and to use adequate posts. Another coil of wire was supplied to carry the fence southward to a cattle-proof gulch. This fence should be completed early in July.

Kaiwiki, 3rd. Series, Lot 22. Owned by S. K. Keaki and leased for grazing by Joe de Lima, of Hakalau. During inspection I found the lessee setting posts for the fence along the mauka boundary of this lot. Many of his posts were rejected and he was advised of the specifications for our forest boundary fence. This action was followed later in the month by visits of Ranger Peralto. Fence will be completed in July.

Hakalau-iki, Lot 51. Fence in good condition along west and north sides. Ranger Peralto was instructed to make frequent inspections along the south boundary to discover if cattle cross Kaakini Stream. Some short stretches of fence may be required here.

Hakalau-nui, Umauma, Honohina and Nanue fences, built by the Hakalau Plantation Company, were found to be entirely satisfactory.

Opea-Peleau, Lots 16 and 17. This cooperative fence, built by Tobias de Souza with government wire, was found unsatisfactory in minor details. Posts are excellent but wires are widely spaced and often so high off the ground that the fence is scarcely cattle-proof. Fences ends at gulches are poorly made. One coil of wire was supplied to complete the fence across Lot 16 and to correct the defects mentioned. This fence had not been approved by the end of June.

Kahuku-Piha. This cooperative fence was found very satisfactory as far as it goes but is incomplete. A stretch of about 1000 feet along the mauka boundary of Piha Lot 1, from Kalaiha Gulch to Waikaumalo

Guleh, remains to be built. William Breithaupt, owner of the lot, was advised to finish the fence at once, and he expects to complete it during July.

TREE PLANTING

Incidental to fence inspection some time was spent examining the tree planting done during the past six months by Mr. Bryan and Ranger Peralto. Of the lemon gums set out by Peralto to mark the forest reserve boundary approximately fifty per cent are growing. This is sufficient to make a conspicuous line along the boundary but it is felt advisable nevertheless to make at least one replacement planting of the fail places.

Mr. Bryan's plantings have been almost exclusively of the genus *Ficus*, both on private and government lands along the makai edge of the Hilo Reserve. These plantations also suffered a high mortality in places owing to the excessive rainfall of last spring. The present method of setting the trees in small mounds of earth, instead of in holes as formerly, should make far a much higher percentage of success. On the government land at Puu Kauku Mr. Bryan's experiment of direct sowing of fig seed on tree-fern trunks and moss gives good promise of success inasmuch as the seeds, especially of *Ficus macrophylla*, were found to be germinating very readily. If these seedlings become vigorously established the experiment will have proven the possibility of adding this genus to the rain-forest type of Hawaii by the rapid and cheap method of seed-spotting.

FURTHER WORK

Fencing projects which still require attention along the makai boundary of the Hilo Forest Reserve include Waikaumalo, Maulua-nui, Laupahoe-hoe Homesteads, the lower Laupahoe-hoe-Waipunalei boundary, and the Kahoahuna Homesteads numbers 11, 12, 13.

On the evening of June 20, I was obliged to go to the Hilo Hospital to receive medical attention, remaining there until June 26.

Respectfully submitted,

C. J. KRAEBEL,
Assistant Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, MAY, 1922

July 21, 1922.

Superintendent of Forestry, Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir: I herewith submit a report of the principal work done during the month of May:

NURSERY—DISTRIBUTION OF PLANTS

Oahu:

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Sold			291	291
Gratis	50	162	1,547	1,759
				<hr/> 2,050

SUB-NURSERIES

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Maui and Molokai	130	92		222
Kauai .. .. .	..	235		235
Hawaii .. .. .4,000	243	..		4,243
				<u>4,700</u>

Total for all Islands6,750

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of plants	\$ 6.75
Rent of Office, Nursery Grounds	35.00
Total	<u>\$41.75</u>

PLANTATION COMPANIES AND OTHER CORPORATIONS

The distribution of plants under this heading amounted to 5,000 seedlings.

MAKIKI STATION

The work at this station consisted principally of mixing and sterilizing soil, transplanting trees, etc.

HONOLULU WATERSHED

The work on the watershed consisted of clearing off, making holes and planting; 72 koa trees having been planted.

ADVICE AND ASSISTANCE

The writer has made the following number of calls and given advice at the request of people in and around the city.

Calls made	6
Advice given by telephone	8
Advice given people calling	7

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

REPORT OF FOREST NURSERYMAN, JUNE, 1922

July 21, 1922.

Superintendent of Forestry, Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir: I herewith submit a report of the principal work done during the month of June:

NURSERY—DISTRIBUTION OF PLANTS

Oahu:

	Pot Grown.	Total.
Sold	122	122
Gratis	1,526	1,526
		<u>1,648</u>

SUB-NURSERIES

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Maui and Molokai .. ....	.....	.....	114	114
Kauai .. .....	.....	.....	...	...
Hawaii	2,000	7,300	102	9,402
				<hr/> 9,516 <hr/>
Total for all Islands				11,164

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of plants, Government Nursery	\$ 2.85
Sale of plants, Hilo Nursery	2.15
Sale of plants, Kalaheo Nursery	20.00
Total	<hr/> \$25.00

PRESERVATION OF FOREST RESERVES

Rent of premises at Halfway House, Tantalus, for quarter ending June 30, 1922	\$30.00
Fee for use of land and gathering ti leaves for quarter ending Sept. 31, 1921, Kalahawini Pauoa Valley	12.50
Alfred Rocha, 3 cords dead guava wood taken from Waiahole Forest, Oahu, at \$2.50 per cord	7.50
Black Sand. 173 loads of black sand taken from Makiki Valley Sand Pit during May and June, at \$0.50 per load	86.50
Total	<hr/> \$136.50

ANIMAL INDUSTRY REVOLVING FUND—MAY AND JUNE

Mrs. H. G. Bertleman, vaccine	\$ 12.40
Haleakala Ranch, vaccine	133.00
Walter Hayselden, vaccine	9.00
R. Von Tempsky, vaccine	17.50
Alex Frazier, vaccine	12.50
Parker Ranch, vaccine	205.00
John Hind, Huehue Ranch, vaccine	4.50
Total	<hr/> \$393.90

PLANTATION COMPANIES AND OTHER CORPORATIONS

Under this heading 765 pot grown Australian red cedar trees were distributed.

MAKIKI STATION

The work done at this station consisted principally of transplanting, mixing and sterilizing soil and doing other routine work.

HONOLULU WATERSHED

The work on the watershed consisted of clearing trails, making holes and planting trees. The regular gang planted 517 koa trees.

ADVICE AND ASSISTANCE

In addition to visits made to places in and around town a visit was made to Ford Island at the request of the Commander of the Navy Aviation Company. Plans are being made for the extensive planting of trees and shrubs, etc., in the near future.

Other calls made at the request of people in the city..... 8
 Advice given people calling 6
 Advice given by telephone 4

Respectfully submitted,

DAVID HAUGHS,
 Forest Nurseryman.

DIVISION OF ENTOMOLOGY

REPORT OF ENTOMOLOGIST, MAY, 1922

June 13, 1922.

Board of Commissioners of Agriculture and Forestry,
 Honolulu, T. H.

Gentlemen: During the month of May the insectary handled 8,300 pupae of the melon fly, from which there were bred 1,822 females and 1,690 males of *Opisus fletcheri*.

The distribution of the parasites was as follows:

MELON FLY PARASITES

Opisus fletcheri

Oahu:	Females.	Males.
Cucumber Field, Moanalua, Honolulu	750	750
Cucumber Field, Kalakauau Ave., Honolulu	200	200

FRUIT FLY PARASITES

Diachasma Tryoni

Oahu:	Females.	Males.
Mr. Ho Tong, Beretania St., Honolulu	300	250
Mrs. Wall, Makiki St., Honolulu	150	150
Mrs. Waterhouse, 1944 Keeaumoku St.	100	100

Diachasma Fullawayi

Oahu:	Females.	Males.
Mr. Ho Tong, Beretania St., Honolulu	60	60
Mrs. Wall, Makiki St., Honolulu	50	50
Mrs. Waterhouse, 1944 Keeaumoku St.	50	50

Dirhinus Giffardii

Oahu:	Females.	Males.
Mrs. George Sherman, Nuuanu Ave., Honolulu	300	300

Opisus humilis

Oahu:	Females.	Males.
Mr. Ho Tong, Beretania St., Honolulu	50	50
Mrs. Waterhouse, 1944 Keeaumoku St.	50	50

Galesus Silvestrii

Oahu:	Males and Females.
Mrs. George Sherman, Nuuanu St.	400

Tetrastichus Giffardianus

Oahu:	Males and Females.
Mr. Ho Tong, Beretania St., Honolulu	1,000
Mrs. Wall, Makiki St., Honolulu	200
Mrs. Waterhouse, 1944 Keeaumoku St	400

CORN LEAF HOPPER

Hawaii:	Males and Females.
Mr. Abel Makekau, Pahala, Hawaii	600
Miss Lily K. Auld, Waiohinu, Hawaii	600
Mr. Ben Kamakau, Holualoa, Hawaii	500
Mr. Clyde E. Crawford, Kealahakau, Hawaii	600

The time of the Entomologist has been occupied principally, as in the month before, in handling the consignments of beneficial insects from Mr. Osborn, who is now in the Vera Cruz district of Mexico.

Two shipments were received from Orizaba, one on the 16th, and another on the 19th.

Respectfully submitted,
D. T. FULLAWAY,
Entomologist.

REPORT OF ENTOMOLOGIST, JUNE, 1922

August 19, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: During the month of June the insectary handled 3,100 pupae of the melon fly, from which there were bred 930 females and 805 males of the *Opius fletcheri*.

The distribution of the parasites was as follows:

MELON FLY PARASITES

Opius fletcheri

Oahu:	Males and Females.
Mr. L. M. Smith, Maunawai, Oahu	200 200
Cucumber Field, Moanalua, Honolulu	150 150
Dr. Bliss, Pearl City, Oahu	100 100

FRUIT FLY PARASITES

Diachasma Tryoni

Oahu:	Females.	Males.
Mr. L. M. Smith, Maunawai, Oahu	150	150
Maui:		
Mr. D. H. Case, Wailuku	50	50
Mr. H. P. Baldwin, Wailuku	175	150

Opius humilis

Maui:	Females.	Males
Mr. Marshall, Wailuku,	25	25

Diachasma Fullawayi

Maui:	Females.	Males
Mr. D. H. Case, Wailuku	100	100
Mr. Marshall, Wailuku	50	50

Tetrastichus Giffardianus

Oahu:	Males and Females.
Mr. L. M. Smith, Maunawai	100
Maui:	
Mr. Marshall, Wailuku	200
Mr. D. H. Case, Wailuku	300
Mr. H. P. Baldwin, Wailuku	600

CORN LEAF HOPPER PARASITE

Maui:	Males and Females.
Mr. Frank Auhana, Kihei	500
Mr. C. F. Crawford, Wailuku	500

Two shipments of mealy bug parasites and predators were received from Mr. Osborn during the month, the first on the 22 instant, from El Potrero, and the second on the 28 instant, from Orizaba. They included three species of *Coccinellids* and three internal parasites, of *P. Nipae*, in one instance, and two species of *Coccinellids* (for sugar cane and pineapple mealy bugs), and one internal parasite of *P. calceolariae*. Most of the effort of the Entomology Division was spent in handling these consignments and related work.

Respectfully submitted,

D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION

REPORT OF THE CHIEF PLANT INSPECTOR, MAY, 1922

May 31, 1922.

Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of May, 1922, as follows:

During the month we boarded 49 vessels, 22 of which carried vegetable matter and 8 came by way of the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	1339 lots	21,584 pkgs.
Fumigated	1 lot	1 pkg.
Burned	57 lots	57 pkgs.
Total Inspected	1397 lots	21,642 pkgs.

Of these shipments 21,225 packages arrived as freight, 239 as baggage and 178 as mail.

RICE AND BEAN SHIPMENTS

21,239 bags of rice and 846 bags of beans from the United States, and 523 bags of rice and 2555 bags of beans from Japan, all clean.

PESTS INTERCEPTED

Approximately 4002 pieces of baggage belonging to immigrants from foreign countries were examined, from which 20 lots of fruit and 27 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned materials follows:

From Japan:

Cremastogaster sp. in logs, cargo.*Lepidopterous* borer, larvae and pupae, close to *Zeuzera*, cargo.

From Philippines:

Bruchus chinensis in beans, mail.*Bruchus chinensis* in seed, mail.

PROHIBITED MATERIAL BURNED

4 packages wheat, mail from Australia.

Plant, baggage from China.

Paddy rice, mail from Philippines.

Beans, mail from Philippines.

Plant, baggage from Philippines.

Central American bananas, baggage from California.

MATERIAL FUMIGATED

Logs (2 shipments) cargo, from Japan, infestation.

Seed, mail, from Philippines, infestation.

HILO INSPECTION

Brother M. Newell, Inspector at Hilo, reports the arrival of 5 vessels with all carrying vegetable matter consisting of 256 lots and 2120 parcels. 8196 bags of rice and 793 bags of beans arrived clean.

KAHULUI INSPECTION

Mr. L. Gillin, Inspector for Maui, reports the arrival of 6 vessels. 4 carried vegetable matter consisting of 19 lots and 543 parcels. 4350 bags of rice and 60 bags of beans were passed as free from pests.

INTER-ISLAND INSPECTION

55 vessels plying between Honolulu and the other Island ports were attended and the following inspections made:

PASSED		REJECTED	
Taro	107 bags.	Fruit	4 pkgs.
Vegetables	59 pkgs.	Plants	4 pkgs.
Fruit	250 pkgs.		—
Plants	217 pkgs.		8 pkgs.
Seeds	1 pkg.		
Sugar Cane	2 cases		
Pine Shoots	1408 bags.		
	2044 pkgs.		

Respectfully submitted,
E. M. EHRHORN,
Chief Plant Inspector.

REPORT OF THE CHIEF PLANT INSPECTOR, JUNE, 1922

June 30, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of June, 1922, as follows:

During the month we boarded 43 vessels, 21 of which carried vegetable matter and 5 came via the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	1578 lots	23,848 pkgs.
Fumigated	2 lots	2 pkgs.
Burned	194 lots	194 pkgs.
Total inspected	1774 lots	24,044 pkgs.

Of these shipments 23,539 packages arrived as freight, 355 as baggage and 150 as mail.

RICE AND BEAN SHIPMENTS

21,374 bags of rice and 736 bags of beans from the United States, and 743 bags of rice and 1802 bags of beans from Japan arrived, all clean.

PESTS INTERCEPTED

Approximately 7225 pieces of baggage belonging to immigrants from foreign countries were examined from which 42 lots of fruit and 151 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned material follows:

From Japan:

Cremastogaster sp. and *Camponotus* sp. in logs, cargo.

PROHIBITED MATERIAL BURNED

- 3 pkgs. paddy rice, mail from Manila.
- 3 pkgs. corn, mail from Manila.
- 2 pkgs. tree seeds, baggage from Manila.
- 1 pkg. paddy rice, baggage from Manila.

MATERIAL FUMIGATED

- 1 pkg. beans, mail from Manila, precautionary.
- 1 pkg. tree seeds, mail from Manila, precautionary.
- 1 lot logs, cargo from Japan, infestation.

HILO INSPECTION

Brother M. Newell, Inspector at Hilo, reports the arrival of 8 vessels with 6 carrying vegetable matter consisting of 235 lots and 1972 parcels. 11,670 bags of rice and 549 bags of beans arrived from the United States and Japan and were passed as free from infestation.

KAHULUI INSPECTION

Mr. L. Gillin, Inspector for Maui, reports the arrival of 6 vessels with 4 carrying vegetable matter consisting of 34 lots and 470 packages. 8363 bags of rice and 85 bags of beans from the mainland were passed.

INTER-ISLAND INSPECTION

52 vessels plying between Honolulu and other Island ports were attended and the following inspections made:

PASSED		REJECTED	
Taro	318 bags	Plants	12 pkgs.
Vegetables	50 pkgs.	Fruit	4 pkgs.
Fruit	314 pkgs.		—
Plants	124 pkgs.		16 pkgs.
Seeds	8 pkgs.		
Sugar Cane	16 cases		
Pine Shoots	269 bags		
	1099 pkgs.		

Respectfully submitted,

E. M. EHRHORN,
Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

REPORT OF TERRITORIAL VETERINARIAN, MAY, 1922

July 5, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I have the honor to submit the following report on the work of the Division for the month of May:

TUBERCULOSIS CONTROL

For a detailed report on this work, see appended report of the Assistant Territorial Veterinarian. No cattle were condemned during the month and some of the dairies tested are located in a heavily infected district. This would indicate a considerable improvement in this particular area.

During the month 50 head of condemned cattle were autopsied, resulting in the condemnation of 3 head as being unfit for beef due to generalized tuberculosis. These cases were very bad and have acted as "spreaders" on the premises from which they came for some time.

INFECTIOUS DISEASES

No reports of outbreaks of infectious diseases among the live stock of this island have been received during the past month. Outbreaks of disease, occurring on the other islands, will be taken up under their respective headings. In the early part of this month, an inspection trip was taken into the Hamakua and Kohala districts, island of Hawaii, in the interest of the control and suppression of glanders. A special report dealing with this trip was made to the Board.

LIVE STOCK IMPORTATIONS

Among the various classes of live stock received during the month, were two shipments of butcher hogs, the first to arrive here in some time. They came down with all the necessary papers. No difficulty was experienced by the importer in obtaining all the certificates required by the present regulations.

Of considerable importance to the horse breeding industry of the Territory, was the importation of a very high class thoroughbred stallion, assigned to the Parker Ranch, by the U. S. Army Remount Department. This is the first time such an assignment has been made in

this Territory and the results are bound to be far reaching. The Territory is indeed fortunate to be able to obtain the services of such stallions as are to be found in the Army Remount Department, and we hope that more such assignments will be made in the near future. I believe it possible for all the ranches to obtain such stallions if they are willing to comply with the very reasonable requirements governing such assignment.

KAUAI

TUBERCULOSIS CONTROL—A total of 39 head of dairy cattle were tested during the month, all of which passed the test.

ANTHRAX CONTROL—A total of 1577 head of cattle on the Hanalei Ranch were vaccinated against anthrax during the past month. This about completes the vaccination for this year. No deaths from anthrax have occurred on this ranch since March of 1919.

MISCELLANEOUS DISEASES—A few cases of equine influenza occurred among the horses on Grove Farm. No deaths were reported, the cases apparently being amenable to treatment. Actinomycosis was observed in one case on the Lihue Plantation. The hog situation on this island seems to have cleared up entirely as no reports of deaths or new outbreaks have been received.

EAST HAWAII

PORT INSPECTION—K. Nakahodo.

3 head of cattle to be shipped to Honolulu.

Steamship Enterprise from San Francisco, 4 crates poultry.

DISEASE CONTROL—Tuberculosis control work was held up during the past month.

No outbreaks of hemorrhagic septicemia occurred during the month. Mr. W. H. Haselton reported that two of his cattle, which were vaccinated against hemorrhagic septicemia afterwards died, presumably from this disease. Mr. William Campsie states that no further cases have occurred in the Kaalualu area of their ranch and that additional vaccination was not necessary at the present time. A total loss this year of less than 25 head is very satisfactory as compared to the loss suffered in the two previous outbreaks.

Four cases have occurred in the Hilo-Onomea dairy herd with two deaths and two recoveries.

WEST HAWAII

TUBERCULOSIS CONTROL—During the past month a total of 129 head of cattle were tested, out of which number 123 passed and 6 condemned and branded.

GLANDERS—On May 3rd, five mules showing clinical symptoms of nasal glanders and farcy, were condemned at the Halawa Plantation Company's stables. On May 6th, one horse and one mule showing clinical symptoms of nasal glanders and farcy, were condemned at the stables of the Union Mill and Plantation Company. The condemned animals were shot and thrown over the cliffs into the sea. The stables of both these plantations were cleaned and disinfected as far as such was possible.

On May 9th, accompanied by the Territorial Veterinarian, a tour of inspection was made through Waipo Valley and nothing of a suspicious nature encountered. No history of any diseased animals from this particular section was obtainable. Waipo Valley is apparently free from glanders at the present time.

On May 11th to the 14th, a tour of inspection was made through the Kohala district, testing all of the horse stock at the following plantation stables:

Puakea Plantation Company.....48 tested; 1 condemned
Halawa Plantation Company.....58 tested; 2 condemned
Union Mill & Plantation Company....111 tested; 3 condemned

These animals were shot and thrown over the cliffs. Instructions for a thorough cleaning and disinfection of the stables were given in each case.

From August, 1921, to May 31, 1922, a total of 15 cases of glanders have occurred in the Kohala district, all but one being in the above mentioned stables.

MAUI

TUBERCULOSIS CONTROL—During the month a total of 6 head of dairy cattle were tested, all of which passed.

HEMORRHAGIC SEPTICEMIA—The chief work during the month was in connection with the control of hemorrhagic septicemia. A total of 1026 head of young stock, calves, were vaccinated on the Raymond, Rice and Von Tempsky ranches. No report on the number of deaths during the month was made. Since the first of the year, approximately 5000 head of cattle, mostly all calves, have been vaccinated. The loss totals 135 head. This is small when compared to the Kaalualu outbreak where over 400 head of mature cattle were lost on the first appearance of the disease.

During the month 126 head of horses were vaccinated against hemorrhagic septicemia on the Raymond ranch as a result of two autopsies made on horses recently dead of a disease, said by the old residents, to have existed in this district for many years. From the history of the cases, together with the lesions found on autopsy, the disease was definitely diagnosed as hemorrhagic septicemia. Dr. Fitzgerald is of the opinion that this disease has been the chief cause of loss in horses in the Ulupalakua district. Vaccination should overcome this loss and so stimulate horse breeding in this district.

Several cases of epizootic catarrhal fever in horses have been observed and placed in the isolation hospital for treatment. No fatalities are recorded and Dr. Fitzgerald reports that the virulence of this disease appears to be less than in previous outbreaks.

Respectfully submitted,

LEONARD N. CASE,
Territorial Veterinarian.

REPORT OF TERRITORIAL VETERINARIAN, JUNE, 1922

July 27, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I have the honor to report on the work of the Division of Animal Industry for the month of June, as follows:

TUBERCULOSIS CONTROL

For a detailed report on this work, see the appended report of the Assistant Territorial Veterinarian.

During the month a total of 529 head of cattle were tested, out of which number 10 head were condemned and branded, which is less than 2% and a very good record for the particular district in which these tests were made.

The percentage of tuberculosis among the dairy herds proper of Honolulu, is 1.5%, the lowest percentage ever reached since systematic eradication work commenced. As the tuberculosis indemnification fund is at present exhausted, a continuation of this work awaits your favorable action. This phase of the subject was taken up in a special letter to the Executive Officer.

INFECTIOUS AND CONTAGIOUS DISEASES

SWINE:—No outbreaks of disease among swine of an infectious or contagious nature were reported from any part of the Territory. The loss of a few small pigs was reported in a piggery at Maile, this island. An investigation indicated the cause of death to be faulty diet together with an unsanitary condition of the premises. At the time the investigation was made one sow and one small pig were off feed. A triple vaccination was made in the way of protection and advise given the owner re: diet and sanitation. A later report stated that the above mentioned sick pigs had died. No further loss has been reported.

CATTLE:—A small outbreak of bovine hemorrhagic septicemia was reported by Dr. Rowat as occurring on the Huehue Ranch, with the loss of two animals. No reports of disease have reached this office from other parts on the island of Hawaii.

The hemorrhagic septicemia situation of the island of Maui has been made the subject of a special report to the Executive Officer. In this report I have taken up in detail the criticisms I found necessary to make in regard to the handling of the situation over there. In a general way I have touched upon the conduct of official work on the outside islands and indicated that a change in system is desirable.

LIVE STOCK IMPORTATIONS AND PORT INSPECTION

A detailed list of the live stock imported during the past month will be found in the appended report of my assistant.

In order to systematize the work of port inspection and bring this branch of the service up to a high degree of efficiency it will be necessary to station a man on the water-front whose entire time will be occupied in this work. He will be in close touch with the movement of all shipping and will board and inspect all vessels at the time they dock; see that the rules and regulations of the Board are complied with and enforced and give me personal notification of the presence on board of live stock so that the proper inspection of same can be made with as little delay as possible. Under the present system, or lack of system, I do not get the proper notification a quarter of the time; rarely get the name of the vessel sighted and many times have no idea when or where they will dock.

When I have finished with the arrangements I have undertaken, I believe that this important branch of the service will be fully and efficiently covered.

WEST HAWAII

TUBERCULOSIS CONTROL:—Dr. Rowat reports the testing of 344 head of cattle of which number 11 head were condemned and branded. Of these, 5 head have been slaughtered.

BOVINE HEMORRHAGIC SEPTICEMIA:—One small outbreak was reported on the Huehue Ranch with the loss of 2 head.

EAST HAWAII

TUBERCULOSIS CONTROL:—Dr. Elliot reports the testing of 65 head of cattle, all of which passed.

BOVINE HEMORRHAGIC SEPTICEMIA:—No outbreaks of this disease have occurred in this district during the past month.

KAUAI

TUBERCULOSIS CONTROL:—Dr. Golding reports the testing of 302 head of cattle, of which number 300 passed and 2 were condemned and branded.

ANTHRAX CONTROL:—During the past month 144 head of stock on the Hanalei Ranch were given the serum-simultaneous vaccination.

No outbreaks of infectious diseases occurred on the island during the month.

MAUI

No report on the official work conducted on the island has been received, although several attempts were made to get it.

Respectfully submitted,

LEONARD N. CASE,
Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN,

MAY, 1922

July 5, 1922.

Dr Leonard N. Case,

Territorial Veterinarian, Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir: I beg to submit the following report of work performed during the month of May, 1922:—

TUBERCULOSIS CONTROL

Sixty-eight head of cattle were tuberculin tested as follows:

	No. of Head.	Passed.
M. T. Brayon	7	7
W. E. Bellina	49	49
K. Nakahodo	3	3
Chas. Lucas	9	9
Total	68	68

During this month 50 head of cattle condemned at Waianae Plantation were examined-post mortem at one of the local slaughter houses.

CULTURE MEDIA

Three thousand cubic centimeters of nutrient agar was prepared.

This media to be used in the preparation of chicken sore-head vaccine.

LIVE STOCK IMPORTATIONS

During the month of May the following live stock was admitted at this port:—

Dogs, 14; cats, 4; hogs, 137; mules, 58; horses, 2; cattle, 9; poultry, 171 crates.

Of the 14 dogs, 6 came from countries free from rabies or had been given the rabies treatment previous to shipment.

One of the horses was a thoroughbred stallion from the Army Remount Department assigned to the Parker Ranch.

BIOLOGICS

Shipments of various biologics were received and distributed to the deputies on Hawaii, Maui and Kauai.

Respectfully submitted,

L. E. CASE,
Assistant Territorial Veterinarian.

**REPORT OF THE ASSISTANT TERRITORIAL VETERINARIAN,
JUNE, 1922**

Dr. Leonard N. Case,
Territorial Veterinarian, Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir: I beg to submit the following report of work done during the month of June, 1922:—

TUBERCULOSIS CONTROL

	Tested.	Passed.	Condemned.
M. Ferriera	33	32	1
Leahi Home	52	51	1
Frank Teixeira	32	32	0
M. T. Brayon	23	23	0
Carrie Moniz	3	3	0
K. Kubo	36	33	3
Joe Teixeira	37	37	0
K. Nakahodo	1	1	0
J. J. Sanchez	33	33	0
T. Horimoto	21	17	4
K. Saiki	7	7	0
S. Hirata	26	26	0
G. Toma	4	4	0
Antone Joseph	18	18	0
Geo. P. Cooke	5	5	0
Juli Paka	63	62	1
M. Fujisue	24	24	0
T. F. Farm	112	112	0
S. W. Walsh.....	4	4	0
Total.....	534	524	10

A total of 31 head of tuberculous cattle were slaughtered and lesions demonstrated. Twenty-six of these were from the Waianae Company ranch.

RABIES VACCINATION

A. R. Glaisyer	1 Airedale
E. J. Davies	1 Bulldog
Capt. Garrison	1 Setter Bitch
Mrs. Belle Bucklin.....	2 Fox Terriers
Mrs. B. Robinson	1 Chow Dog
C. H. Bellina	1 Dog
R. W. Shingle.....	1 Fox Terrier

SORE-HEAD VACCINE

Fourteen hundred and twenty cubic centimeters of chicken sore-head vaccine were prepared and distributed to various poultry raisers, chiefly on the other islands, during this month.

SWINE DISEASES

Mr. O. St. John Gilbert's entire herd of hogs at Maile, Oahu, were treated with hog cholera serum and mixed infection bacterine (swine) and anti-hemorrhagic septicemia serum.

LIVE STOCK IMPORTATIONS

The following live stock was entered at this port:—

Dogs, 6; poultry, 129 crates; bears, 5; pigeons, 2 crates; mules, 10 head; horses, 2 head; hogs, 4 head; cattle, 11 head; camels, 3 head; lioness, 1; black panther, 1; leopards, 3; baboons, 1; monkeys, 1; lynx, 1; wombats, 2; kangaroos, wallabies and wallaroos, 29.

Respectfully submitted,

L. E. CASE,
Assistant Territorial Veterinarian.

BY AUTHORITY

PERMITS TO START FIRES REQUIRED

Notice is hereby given that, in accordance with Sec. 497, R. H. L., 1915, IT IS FORBIDDEN until further notice, to start fires to clear land, including the burning of fallows, stumps, logs, brush, dry grass or fallen timber on any land, other than cane land, within the Districts of Ewa and Waialua, within the City and County of Honolulu, unless written permission has first been obtained from the local fire warden.

The fire wardens for these districts are, Messrs. H. Blomfield Brown, James Gibb, A. A. Wilson, G. M. Robertson and George Wilson.

The law requires that "such fires shall not be started during a heavy wind or without sufficient help present to control the same, and the fire shall be watched by the person setting the same, or by competent agents of his, until put out."

C. S. JUDD,
Chief Fire Warden.

Honolulu, T. H., June 19, 1922.

BY AUTHORITY

PERMITS TO START FIRES REQUIRED

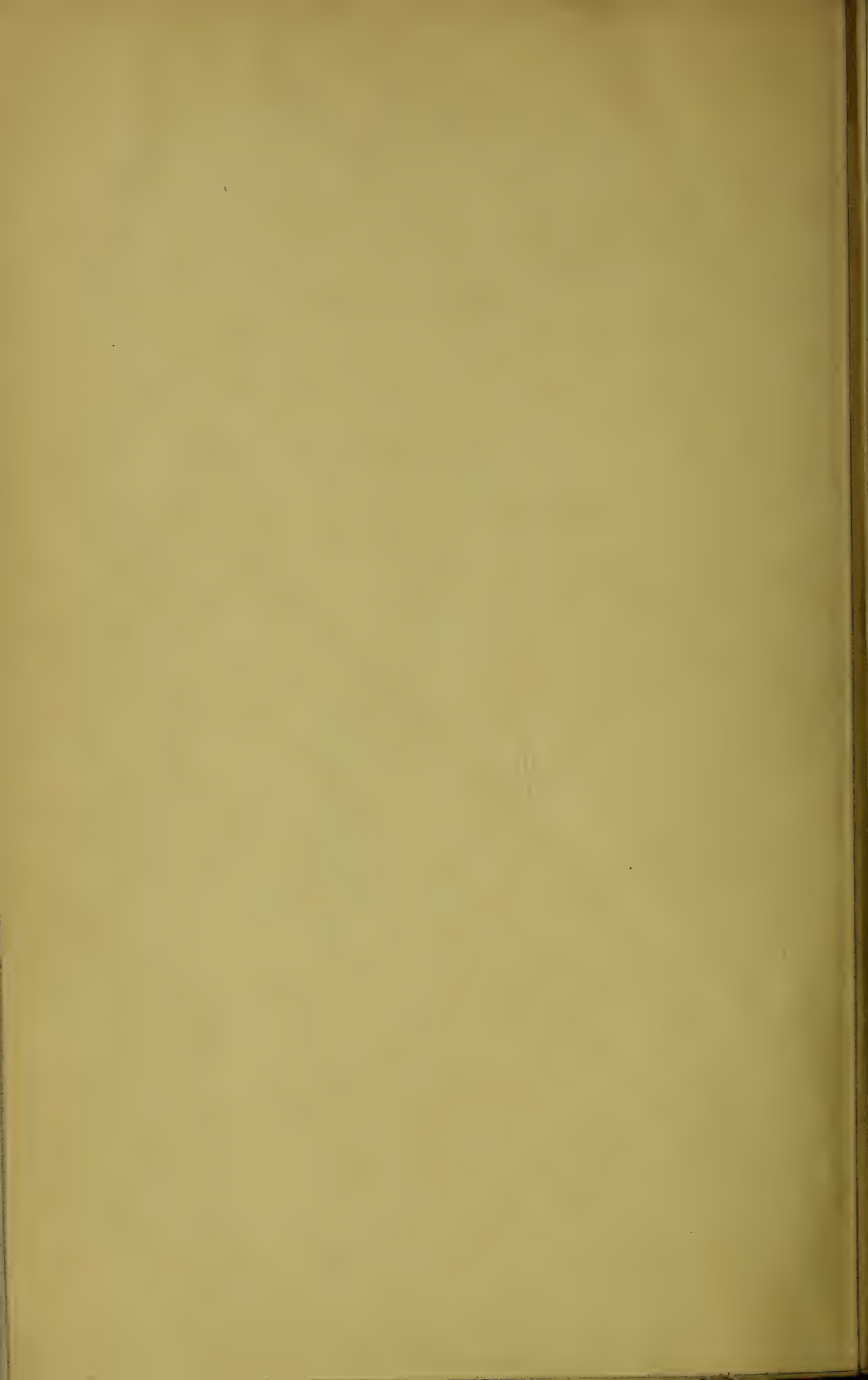
Notice is hereby given that, in accordance with Sec. 497, R. L. H., 1915, it is forbidden to start fires to clear land, including the burning of fallows, stumps, logs, brush, dry grass, or fallen timber, until further notice, on any land in that part of East Hawaii from Waipio Valley to Kau, unless written permission has first been obtained from the local District Fire Warden. The law requires that "Such fires shall not be

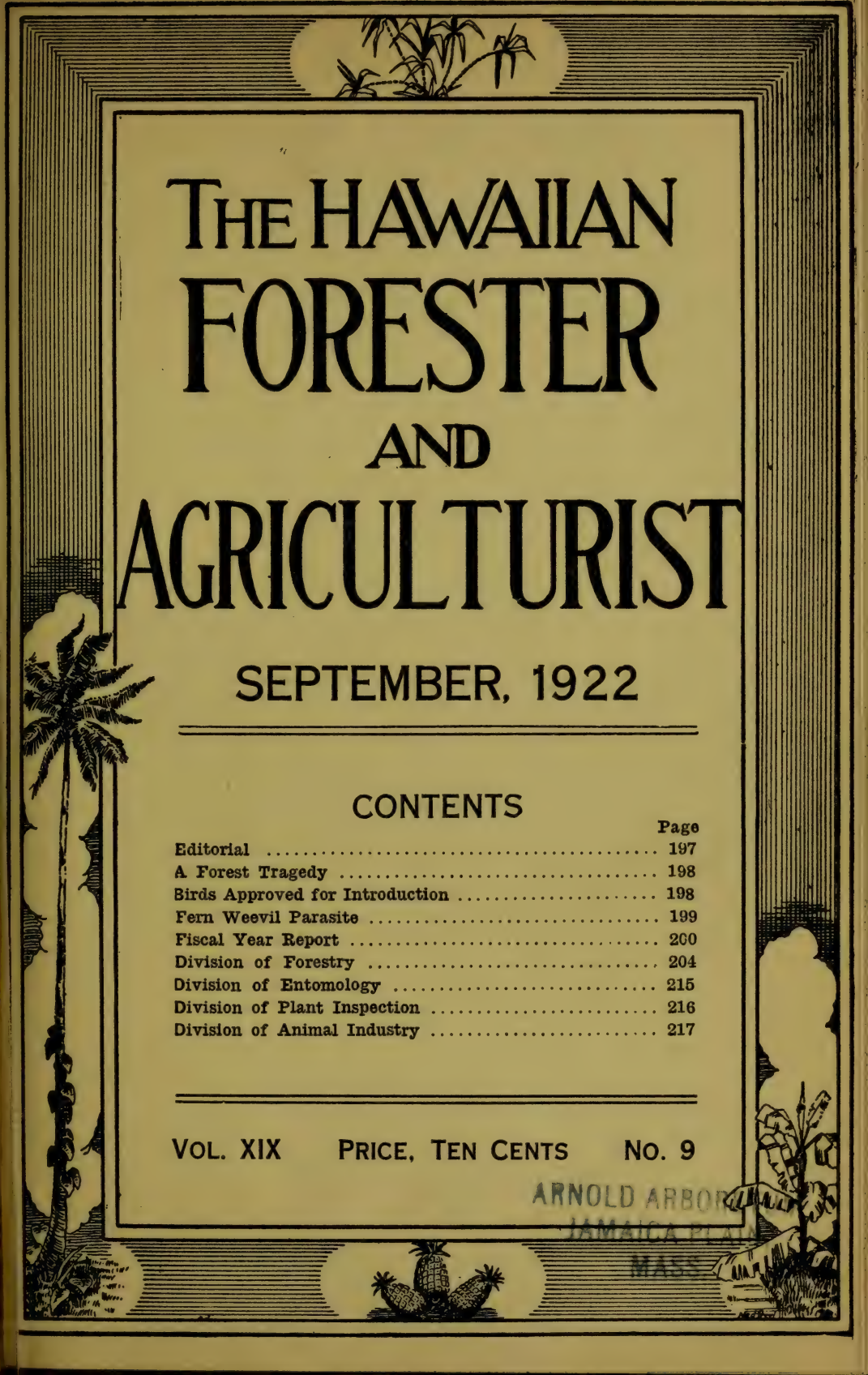
started during a heavy wind or without sufficient help present to control the same and the fire shall be watched by the person setting the same, or by competent agents of his, until put out.”

The District Fire Wardens for East Hawaii are: W. P. Naquin, Honokaa, from Waipio Valley to Koholalele; D. S. Macalister, Kukaiau, from Kukaiau to Manowaialee; John M. Ross, Hakalau, from Ookala to Kaupakuea; J. J. Ignacio, Papaaloa, for the land of Laupahoe; J. T. Moir, Papaikou, from Makahanaloa to Paukaa; James Henderson, Hilo, from Kikala to Waiakea, inclusively; and A. J. Watt, Olaa, for Puna.

C. S. JUDD,

Chief Fire Warden,
Territory of Hawaii.





THE HAWAIIAN FORESTER AND AGRICULTURIST

SEPTEMBER, 1922

CONTENTS

	Page
Editorial	197
A Forest Tragedy	198
Birds Approved for Introduction	198
Fern Weevil Parasite	199
Fiscal Year Report	200
Division of Forestry	204
Division of Entomology	215
Division of Plant Inspection	216
Division of Animal Industry	217

VOL. XIX

PRICE, TEN CENTS

No. 9

ARNOLD ARBOR
JAMAICA PLANTATION
MASS.

The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy ; \$1.00 a year ; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,
H. M. von Holt,

W. M. Giffard,
A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

David Kapihe, *Forest Ranger for Tantalus, Oahu.*

J. P. Pico, *Forest Ranger for Waiaszae-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Eleele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss Helen Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX.

HONOLULU, SEPTEMBER, 1922.

NO. 9

The fiscal year report of the four Divisions of the Board to the Governor appears in this issue.

The removal of cattle from an important section of the Hilo Reserve was a part of the accomplishment of the Division of Forestry during July.

A progress report on the efficiency of the parasite on the fern weevil, which was imported into the Territory from Australia about a year ago, is printed in this issue.

Approval has been given by the Board for the importation into the Territory of the straw-necked ibis, pewee lark, and meadow lark, to help in the control of the cut worm and horn fly.

The sugar plantations adjacent to the Hilo Forest have acted in a gratifying manner on the suggestion of fencing the exposed boundary of the reserve where it crosses lands under their control.

The proposal to make Akaka Falls on Hawaii more accessible should be carried through so that this unusual waterfall, which has a drop of 420 feet and is surrounded by very striking scenery, may be seen by more visitors to the big island.

During July four shipments of mealy bug parasites and predators were received from our Field Entomologist in Mexico. Since they were taken on sugar cane, pineapples, and related plants it is hoped that they will help in the control of the mealy bug associated with these plants.

The whole of July was spent on the island of Hawaii by the Superintendent of Forestry and his assistant arranging for the construction and completion of fences on unprotected boundaries of the Hilo and Olaa Forest Reserves while weather conditions permitted work in the forest. As will be seen by their current reports, much was accomplished along this line during the month,

A FOREST TRAGEDY

He left his camp-fire burning to see if the fire lookout would
pick it up.

He did.

He thought this would be a good test to see if the district
ranger was on the job.

He was.

He wondered if a fire would burn very fast in the dry forest.
It did.

He thought he could get away before the ranger could catch
up with him.

He couldn't.

He thought he could bluff the judge at his trial.

He didn't.

He wondered if the judge would have the nerve to sentence
him to jail.

He did.

We wonder if he will put out his camp-fire the next time he
is in the forest.

He will.

BIRDS APPROVED FOR INTRODUCTION

Acting on the suggestion of Entomologist Fullaway that the straw-necked ibis (*Carphibus spinicollis*), the pewee lark (*Grallina picata*), and the meadow lark (*Sturnella magna*) could be introduced into the Territory without detriment to the agricultural interests of the islands as possible aids in the control of the cutworm and hornfly pests, the Board authorized the Executive Officer to secure the advice of Dr. R. C. L. Perkins, expert ornithologist, on the proposed introductions.

Dr. Perkins' reply of July 14, 1922, is printed herewith, and at a meeting held on August 24, the Board authorized the introduction of these three birds.

4 Thurlestone Road,
Newton Abbot, England,
July 14th, 1922.

C. S. Judd, Esq.,
Executive Officer,
Board of Commissioners of Agriculture,
Hawaii.

Dear Mr. Judd: I am sorry I have not replied to your letter of May 13th, which was received some weeks ago. I have been very unwell during this time and my correspondence has been interrupted.

Personally I know nothing against the introduction of the three birds you mention and I should think that some birds which keep to the open country and are insectivorous might be introduced with advantage.

Whether you will be successful in establishing all—or indeed any of these—remains to be seen. I should be very careful in the matter of introducing forest birds, especially anything of the woodpecker lot, or birds with the habits of woodpeckers. Though these might destroy a good many boring insects, they would be sure to destroy a lot of the beneficial ones, especially grubs of the wasps of the genus *Odynerus*, which nest frequently in the holes made by other and injurious insects. If these beneficial things were destroyed, it would probably be found that more harm than good had been achieved, even though the borers themselves were decreased in numbers,

Yours very truly,

R. C. L. PERKINS.

P. S.—Any birds, which you find—on published records of the stomach contents—feed to any considerable extent on insects of the order *Hymenoptera*, should not be considered at all in making new introductions. It would be too risky.

FERN WEEVIL PARASITE

The recent discovery of the unfortunate presence of the fern weevil in the ditch country on the island of Maui brings up the question of measures of relief. Owing to the extent of the infestation, the absolute eradication by clearing and burning is out of the question and the parasite must be relied upon for controlling this pest of the ferns.

The following progress report on the effectiveness of this parasite, which was introduced from Australia about a year ago, will be read by all who are interested in the subject:

Honokaa, Hawaii, Aug. 20, 1922.

Dear Mr. Agée: On August 6th, I made an examination of ferns near the Volcano residence of Mr. W. M. Giffard to determine the present position and abundance of the fern-weevil *Syagrus fulvitaris* and the distribution and effectiveness of its parasite *Ischiogonus syagrii*. This is about one year since I originally shipped this parasite from Australia.

The parasite is everywhere well established. At all points examined, where the weevil has spread, evidences of the parasite were found. Living larvae or pupae of the parasite were found on or near the dead weevil larvae, on which the parasites had fed, or empty cocoons of the parasite were present in the hollowed fern-stems where the weevil had worked before attack by the parasite. These empty cocoons were particularly evident wherever the weevil has spread. These cocoons of the wasp, being silky and tough, remain permanently in the fern-stems after the parasite has emerged, gradually accumulate in a region and are the first evidence that the wasp is present or has been working in any particular locality. In some of these, *Ischiogonus* pupae were still present, and in many others the wasp had already emerged.

It is yet too soon for the parasite to have reached its maximum degree of efficiency, but the weevil is most certainly being checked. The weevil

is still easily found among the ferns, but not by any means in numbers such as I found it, in the same locality, in February, 1920, before the parasite had been introduced. I fully expect the parasite to exert in a few years' time, a far greater check over the weevil than is yet in evidence.

The weevil does not appear to have spread much beyond the area infested by it in 1920. There are yet no signs of it in the ferns on Mr. Giffard's premises, even though these grounds are adjacent to the infested region. It is almost inevitable, in view of the establishment of the parasite and its proven adaptability to the new environment, that there will be a further natural reduction in the abundance of this weevil and in the fern-injury caused by it.

I hope sometime this year to spend several days in a further examination of the fern-weevil situation to secure more exact data on the distribution and damage now being caused by the weevil and to determine, as accurately as possible, the extent of parasitism.

Yours very truly,

C. E. PEMBERTON.

REPORT OF THE BOARD OF AGRICULTURE AND FORESTRY FOR THE FISCAL YEAR ENDING JUNE 30, 1922

Forestry.—The chief work of the division of forestry has continued to be forest protection for water conservation purposes, supplemented by reforestation where the forest is in need of building up. Greater protection from damage by stock was given to the forest by the construction during the calendar year 1921, of 12 miles of new fences on forest reserve boundaries and the repairing of 16.98 miles of existing fences. No material changes were made in any of the forest reserve areas, although it is planned soon to add about 30,000 acres to existing reserves on Hawaii, 12,000 acres on Maui, and a few thousand acres on Oahu. The 47 forest reserves throughout the Territory now include 557,339 acres of government land and 259,770 acres of privately owned land, or a total of 817,109 acres, which is about 20% of the total land area of the Territory. This large area is cared for by only nine forest rangers, far too small a force when the importance of the forest is considered, and 20 more rangers could be used most advantageously. The present force has done good work, however, in building and repairing fences, preventing fire and trespass, planting trees, and ridding the reserves of stock. A total of 328 wild animals, including cattle, pigs, goats, and cats, were eliminated from the reserves during the year. Eleven fires were detected and promptly extinguished during the year 1921. Most of these were only grass fires which did little damage. In two cases, it was possible to arrest the person who started the fire and bring him to justice. The five general nurseries on the four main islands have been improved to give the most efficient service by adding soil sterilizers and propagating houses, where necessary, and from them

281,757 trees were distributed for general planting throughout the Territory. Reforestation on the forest reserves was more extensive than in past years and amounted to the planting out of 44,261 trees of 33 different species in 11 different forest reserves on the four largest islands. Throughout the Territory, on all of the islands except Niihau, 383,458 trees were planted during 1921. Of special interest is the 28-acre plantation of three different species of chaulmoogra oil trees started in December, 1921, in the Waiahole Forest Reserve, Oahu, so that in due time, approximately 10 years, we should be able to supply our own oil for the cure of leprosy. On account of the need for efficient rangers familiar with island conditions the University of Hawaii has been requested to offer courses in forestry for young students wishing to secure forest ranger positions with the Territory.

Entomology.—The activities of the division of entomology during the year have been directed mainly along two lines: (1) The propagation and distribution of beneficial insects previously introduced, and the search for, and introduction of others. (2) The control of insect pests and plant diseases by artificial methods. Under the first heading the following items are noticed. Numerous colonies of fruit fly parasites, dung fly parasites and predators, corn leaf hopper parasites, cabbage worm parasites, fern weevil parasite, etc., have been distributed to points where they were required. The last named parasite has been successfully established in the Kilauea region, where a serious infestation of the fern weevil has existed for several years. An entomologist was supported for four months in Australia to study the factors concerned in the natural control of dung flies and cut worms, two serious pests of the livestock industry. As a result of his investigations, numerous enemies of the insects mentioned were collected and shipped to Hawaii for acclimatization here, the principal ones being several species of tumble bugs useful in the destruction of the manure in which dung flies breed, predaceous beetles, and an internal parasite of cut worms. One of the predators so received, has been reared in large numbers and distributed to many points in the islands and its establishment here definitely assured. It is too early yet to speak with confidence in regard to the establishment of the tumble bugs, but their importance as a control of dung flies cannot be over-estimated and every effort should be made to naturalize them here. A report was also secured on the part played by birds in the control of these injurious species of insects and three birds were recommended, whose introduction is now being sought. Later, an entomologist was sent to South Western United States and Mexico to secure similar enemies of dung flies and also other beneficial insects. This naturalist continues in the field at the present date. As a

result of his efforts, numerous American species of tumble bugs have been received and liberated on the large ranches, and several species of internal parasites, as well as several species of predators upon mealy bugs have also been received and liberated, or colonized for future liberation, as the circumstances required. The following are noted under the second heading. All requests for advice or assistance in the control of injurious insects have been attended to as far as possible, and in doing so occasion has been taken to study the applicability of the spraying and dusting of various mixtures and compounds to the control of insect pests. Considerable data of value has thus been secured. Likewise, a study of the insect pests and diseases of the pineapple plant has been made, and in connection therewith an experiment has been conducted to determine the most suitable insecticide for the control of the pineapple mealy bug, scale, and red spider. A move has been made also, to secure relief from the worst infestations by the introduction of parasitic and predaceous insects. Scientific or popular articles based upon the studies mentioned have been published, or are in course of publication, and the insect collections and entomological library of the Board have been maintained and greatly added to.

Plant Inspection.—The work performed by the Chief Plant Inspector and his assistants during the year consisted of: (1) The inspection of all fruits, plants and vegetables shipped from Honolulu to all ports of the other islands for the purpose of preventing the spread of any pest existing on Oahu to the adjacent islands; (2) the inspection of all fruits, plants and vegetables coming into the Territory by mail, freight or baggage from foreign countries and the mainland of the United States, to prevent the introduction of pests and diseases liable to become injurious to the various agricultural industries of these islands; and (3) the identification, tabulation, and preservation of all pests and plant diseases intercepted in inspection, and the care of all collections of injurious pests which are taken in inspection, as well as material acquired by exchange from foreign countries showing various pests to be guarded against. During the past fiscal year there arrived at Honolulu, Hilo and Kahului, the only ports of the Territory where fruits or vegetables enter directly and at which places local inspectors are stationed, 616 vessels. Of these, 391 carried vegetable matter consisting of 325,600 packages of fruits and vegetables and 3,524 packages of plants and seeds. Of this amount, 302 packages were fumigated on account of infestation of various kinds or as a precaution; 1,296 packages were burned on account of infestation or as contraband; and 716 packages were returned to the original shipper as contraband or unmailable. In addition to the regular steamers, all vessels calling for supplies and fuel are boarded on arrival at

dock and ship's stores such as fruits and vegetables are examined and when found infested are condemned and destroyed. These vessels usually are in need of fresh supplies and we usually find small quantities of horticultural products on hand. Copies of the rules and regulations of the Board of Agriculture and Forestry as well as those of the Federal Horticultural Board are furnished each vessel, giving them the necessary information regarding horticultural products. Since the restriction of shipments of sugar cane, corn, alfalfa, cotton and fruits of avocado and papaya from the United States to Hawaii went into effect by Notice of Quarantine No. 51, all coast-wise vessels have been boarded at anchorage. The necessary papers and declaration blanks are furnished the pursers of all vessels and the regulations pertaining to Notice of Quarantine No. 51 are being carried out successfully. The Fumigation unit at Hilo has been completed and is a valuable asset to the Division of Plant Inspection on Hawaii. Inspection of plant produce from Honolulu to other island ports has continued on the same lines as last year. During the fiscal year 586 vessels were attended and 15,270 packages of fruits, plants and vegetables were inspected. Of this number, 344 packages were refused shipment on account of infestation or having undesirable soil on the roots.

Animal Industry.—Conditions in general have been favorable to the continued prosperity of the livestock industry of the Territory. More attention has been paid to the breeding of high class stock on the various ranches than ever before. A large number of the very best breeding stock has been imported during the year and up-to-date methods of breeding adopted. Cattle breeding in particular, has received considerable attention and many high-class animals of almost all the breeds have been introduced. The effect of such importations is increasingly apparent on all the ranches. During the past year the regulations governing the importation of livestock were revised and brought up to date and at present offer almost absolute protection from the introduction of disease from abroad. The quarantine on dogs was removed and anti-rabies vaccination substituted as offering greater protection to the Territory. Rabies has never existed here and anti-rabies vaccination with close observation of the animals during the period of vaccination, is considered the surest method of protection against its introduction. As in the past, the main work of this division is the control and eradication of infectious and contagious diseases of livestock. Tuberculosis eradication work has continued without interruption under what are considered the most liberal indemnification laws ever written. By means of such laws and systematic work, bovine tuberculosis has been reduced from 31.25% to less than 2% at the present time. Anthrax is practically a

thing of the past, the last death from this disease occurring in the early part of 1919. Glanders has been eradicated from the Territory with the exception of the Kohala District, Island of Hawaii, where recently a number of cases have occurred. A concerted effort is now being made to clean up this last stronghold of glanders in this Territory. A few outbreaks of equine influenza have occurred in several plantation stables, but the losses have been nominal. Botulism or forage poisoning has been reported in several sections, but has assumed slight importance. The control of hemorrhagic septicemia of horses, cattle and swine, especially in the two latter classes of livestock, has constituted a large proportion of the work of this division during the year. This disease has occurred with alarming frequency on a number of the ranches and has occasioned considerable loss. Vaccination offers the only practical means of control and where properly carried out affords the greatest protection. The peculiar characteristics of this disease, its ability to spring up at any time, in any locality, without apparent reason or connecting link between the outbreaks, renders methods of control difficult and eradication almost an impossibility. Of considerable interest and importance in the work of the division, has been the production of a new vaccine to be used in the control of contagious epithelioma or sore-head of poultry. This disease, if taken in time, responds readily to vaccination. Results so far with the use of the new vaccine have been, with the exception of two instances, highly satisfactory. Contagious epithelioma is the bane of the poultry industry here and the importance of a potent vaccine for this disease can hardly be over-estimated.

DIVISION OF FORESTRY

REPORT OF SUPERINTENDENT OF FORESTRY, JULY, 1922

August 19, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of July, 1922:

TREE PLANTING

During the month trees were planted out on four forest reserves, as follows:

Oahu—Honolulu Watershed Reserve.....	Koa	300
Waiahole Forest Reserve.....	Koa	600
	Blackbutt	500
	(<i>E. pilularis</i>)	
Hawaii—Olaa Forest Park Reserve.....	Port Jackson fig.....	20
Sec. B.	(<i>Ficus rubiginosa</i>)	
	Australian red cedar....	20
	(<i>Cedrela australis</i>)	
Hilo Forest Reserve at Piihonua.....	Lemon gum	175
	(<i>E. citriodora</i>)	
Honomu	Port Jackson fig.....	1,000
Kaupakuea	Port Jackson fig.....	590
	<i>Ficus nota</i>	200
	<i>Ficus haematocarpa</i>	100
	<i>Ficus henneana</i>	50
Total number of trees planted.....		3,555

FOREST FIRES

Owing to dry conditions on the island of Hawaii it was deemed prudent to control the starting of fires by forbidding the burning of any brush, etc., to clear land except upon written permission from the District Fire Wardens until further notice in the eastern section of the island from Waipio Valley to Kau. A notice to this effect was therefore published in the July 11, issues of the Hilo Daily Tribune and the Hilo Post-Herald.

The following four fires were reported during the month.

July 11, 1922.—Waianae-Uka, Oahu. District Fire Warden, A. A. Wilson reported a fire which started from artillery practice on the U. S. Military Reservation on the slopes of Kaala about half-way between Maili Hill and Kolekole Pass and which burned over 30 acres. On the following day it broke out again and before it was extinguished by troops, burned over an additional 50 acres, of which one-quarter was covered with trees and the balance with shrubs and grass.

July 11, 1922.—Pauoa Valley, Oahu. A grass fire of unknown origin, but thought to have been started by boys in search of mountain apples, was reported at 2:30 p. m. to Deputy Fire Warden David Haughs who arranged to have men sent to the fire. It was extinguished by 6 p. m. the same day. This fire occurred on the Booth Estate lands back of Pacific Heights.

July 17, 1922.—Waimea, Kauai. A fire of unknown origin was reported by District Fire Warden E. A. Knudsen to have broken out on the ridge between the upper Mohihi crossing and the South Fork of the Waiakoali Stream within the Na Pali-Kona Forest Reserve. He discovered it two days later and on the following day took up some men to extinguish it. This was accomplished on the sixth day after its origin. The fire, which covered over 10 acres, burned into staghorn fern and koa stumps and although it did not do much damage, it might have spread with disastrous results.

July 18, 1922.—Waianae-Uka, Oahu. District Fire Warden A. A. Wilson reported another fire on the military reservation which started above the road to Kolekole Pass and covering 50 acres of grass, shrubs and trees burned into the night before it was extinguished by troops.

WORK ON HAWAII .

The whole of the month was spent on the island of Hawaii, where I made headquarters at the Kilauea Ranger Station and devoted almost the entire time to the various fencing projects on the boundaries of the Hilo and Olaa Forest Reserves. With my assistant I checked the descriptions of survey and maps of the pending revision of the Hilo Forest Reserve and of the new Waiakea Forest Reserve and the addition to the Upper Olaa Forest Reserve, which had been received from the Survey Office only a few weeks previous to my departure for Hawaii. Many errors, due to carelessness in office compilation and draughting, were detected and additions and changes made possible from our intimate knowledge of field conditions were noted and sent back to the Surveyor so that the maps and descriptions could be perfected before being submitted to you for acceptance.

WAIAKEA RESERVE

Field work was done on a portion of the northern boundary of the new Waiakea Forest Reserve and consisted of moving several corners of the boundary, which had been placed out in open land, back to the heavily forested edge of the a-a lava flow which here is the natural and logical boundary. This change will throw a greater acreage into the Waiakea pasture land which is about to be leased for grazing and agricultural purposes.

A suggestion was also made to the Land Commissioner, after a conference in Hilo with Sugar Expert Horner, that proper provisions be made in the new lease of the remnant of government land between the Waiakea Homesteads and the land of Kukuau 1, so that the government would receive the full stumpage value of timber cut on the land and so that such timber would be cut only on land which could and would immediately thereafter be cultivated in cane.

HILO FOREST RESERVE

Inspection of fences and checking the boundary line of this reserve for proper location were made during the month from Punahoa 2 to Humuula in the following places along the 35 miles of the makai boundary: Punahoa 2, Piihonua, Puueo, Makahanaloa, Kaupakuēa, Honomu, Kaiwīki, Waikaumalo and Mauluanui. Fences, where necessary, have been or are being constructed on the reserve boundary crossing these lands.

On the privately owned land of Punahoa 2, where the boundary of the Hilo Forest Reserve forms a corner to embrace 403 acres of forest land upon which both the Olaa and the Hilo Sugar Company flumes have their intakes, there formerly existed a very unsatisfactory situation from the viewpoint of forest protection to which the owners of the land seemed rather indifferent. Cattle belonging to Portuguese dairymen had been wandering at will through the woods back of the intakes as far as, and beyond the Wailuku River because of the total lack of fences. When the situation was clearly presented to the three owners they at once accepted our advice and agreed to building 2.80 miles of fence to protect the forest on this valuable water producing area. On a part of this boundary a tenant was required by his lease to build .98 mile of fence on the Piihonua boundary. The Division cooperated on this stretch to the extent of furnishing the wire, was instrumental in getting the project started, and the fence was completed in July. The same tenant has completed .24 mile on the rest of his boundary and on the remainder, a reliable plantation fence gang is rapidly progressing and has cut 300 posts and cleared 2800 feet of line. On a part of the

boundary, holes for the posts have to be blasted in the pahoe-hoe lava and this necessarily is slow work.

A stretch of fence on the boundary of this reserve at Kaupakuea, built in cooperation with John Souza, who owns adjacent Lot 1, was completed during the month. This is .12 mile in length.

At Honomu another fence .13 mile long is being cooperatively constructed by Victorino Carrera, who owns adjacent Lot 17. The posts have all been reset on the proper line and the wire will be stretched early in August.

It has been necessary to bring pressure to bear on Wm. Breithaupt, the owner of Lot 1 of the Piha Homesteads. We supplied wire to him last December and he built an excellent fence on the forest reserve boundary for a distance of .58 mile, but since April he has done little or no work. He has 900 feet more of fence to build and has been notified that unless this is completed by the end of August and all his cattle gathered in, we will proceed against him for cattle trespass.

A visit was made with John Vieira to the upper boundary of the Waikaumalo lots, owned by him, where 1.40 miles of new fence is needed on the reserve boundary to keep his cattle within bounds. This is the mauka-most boundary along any part of the makai line of the Hilo Reserve and, on account of the heavy jungle and boggy soil, a most difficult location to pack wire to. The whole line was gone over personally with him and he agreed to build the fence at once. Wire was supplied for this purpose on July 12, but although he has let a contract for the job, little had been done at the end of the month. He has therefore been given a similar warning that unless the fence is completed at the earliest practicable date he will be proceeded against for cattle trespass.

REMOVAL OF CATTLE

In connection with the cattle which had been wandering around the flume heads on the lands of Punahoa 2 and into Piihonua on the Hilo Reserve, my assistant gave the owners, on June 14, official notice to remove or shoot them. In subsequent interviews they attempted to justify procrastination, but finally became convinced that we meant business in demanding the elimination of all of their cattle from forest reserve land. To back up our insistence and to be ready to go the limit under the law if it became necessary, I requested and received authority from you to take the drastic measure of shooting the cattle after due notice. I am glad to report that it did not become necessary and that the forest in this region was entirely cleared of cattle by July 20. This was done entirely by the owners who drove, trapped with snares, and finally had to shoot the six remaining animals which had become quite wild from a prolonged and unmolested sojourn in the jungle. The open boundary where the cattle formerly got in is now all closed by a tight fence.

AKAKA FALLS

The makai boundary of the Hilo Reserve has been brought down on the unoccupied government lands of Honomu and Kaiwiki along Kōle-kole Stream to include Akaka Falls and the surrounding forested lands. These falls, which are 420 feet high, are one of the great sights on Hawaii and should be made more accessible to sight-seers. This can easily be done and the adjacent grounds made more comfortable for picnickers at small expense. My assistant who recently took the Governor to see the falls, has made a plan for these improvements which will soon be presented for your consideration.

OLAA FOREST RESERVE

It was also possible for me to give some attention to the Olaa Forest Reserve comprising some 20,000 acres in the heart of the Olaa tree fern and ohia jungle and, in my opinion, very important as a conserver of water. Unsuccessful coffee cultivation ventures, cane planting and grazing have opened up the lower edge of this forest in parts in the back country as far up as opposite $15\frac{3}{4}$ to 23 miles along the Volcano Road. The result has been the conversion of a satisfactory water-conserving native jungle to a more or less open waste of abandoned coffee and cane fields covered with Hilo grass and dead or dying trees, which is supporting a few hundred head of scrubby, bedraggled cattle. These have so puddled the surface soil that sub-drainage has been impaired and the water from the heavy rainfall with difficulty percolates into the subsoil. The result is that over a large area there are no trees to break the force of the raindrops, the rain falls on to a more or less impervious soil, and instead of sinking gradually into the subsoil to appear lower down in springs and wells, rushes off down the slope on the surface in torrents with destructive erosive effect. An old resident of Olaa informs me that the runoff from this region is now three times greater than it was 25 years ago, and we all know that the volcano road has been torn out by floods during the past two winters.

Back of this denuded area lies the Olaa Forest Reserve, which was set aside in 1918, after the lower or makai portion comprising 8,588 acres, had unfortunately been leased by the Land Office for grazing purposes for a period of 15 years from February 5, 1917, for \$860 per annum. The successive holders of this General Lease No. 939 have never been able to get back what they have put into it. The cattle which have been turned loose have wandered far into the jungle, have gone wild and many of them have never been recovered. As a grazing lease, the project is a mistake, as the land is far more valuable for forest purposes. It is here that an application to cut the fern trees for the manufacture of starch was promptly denied.

I made a careful inspection of this particular land and found that it had not been completely fenced, as required by the lease, and that as a result the cattle had wandered further back into the forest reserve. Moreover, I ascertained at the Hilo land office that the last holder of the lease, Ting Sam Ching, was one year in arrears with the rent. These two facts prompted me on July 25, 1922, to lay the situation before the Land Commissioner and I am glad to report that on August 9 he cancelled the lease and gave the lessee 30 days in which to remove his cattle. The land now is entirely under the jurisdiction of this Board and the owner of cattle in the reserve has been warned to remove all of them at once.

I found also that along the southern portion of this reserve there were stretches of boundary which required fencing to keep out homesteaders' stock and immediately made arrangements for building the required fences. One of them, in cooperation with S. Kanemori, 1.13 miles long, had already been started and completed for .30 mile. He is working at the job alone, but is making steady progress and will have it completed in a few months. Another stretch, in cooperation with Nicholas Holowaty is 2.65 miles long and so far .57 mile of line has been all cleared and 228 posts cut. A third stretch, 1.09 miles in length, along the south end of Lots 130 to 136, has government land on the other side of the reserve boundary and this I had Ranger Mackenzie start to build on July 26, with local labor. An inspection made at the end of the month showed that more than half of the line had been cleared and that 83 posts had been cut and substantially set. Owing to the scarcity of trees for posts here a deviation was made in the customary post spacing of 8 feet and 15 feet was adopted as the interval with two

intermediate Douglas fir spreaders. This fence is three miles in from the Volcano Road and the last mile is so boggy that the packing in of wire is very difficult. The fence, however, will be completed before the end of August and then, with the completion of the other two stretches, this reserve will be fully protected from stock by fences.

With Albert Mackenzie of 29 Miles I have arranged for the removal of wild cattle and pigs in this and in the Upper Olaa Reserve. He has agreed to undertake the laborious job for what he can get out of the meat.

OLAA FOREST PARK RESERVE

SECTION C

The fence on the inner side of the forest reserve strips along the Volcano Road from 19½ to 22 miles is so old that cattle are continually breaking through. W. H. Shipman who grazes the adjacent land has agreed to rebuild the fence in August and I have supplied him with the wire for this stretch, which is 2.75 miles long.

A communication was addressed on July 25 to the County Attorney of Hawaii requesting him to enforce the impounding laws along the Volcano Road and especially at 23 Miles, where dairymen deliberately turn their cattle out on the public roadside to graze. These cattle are not only destroying the tree ferns which form an asset to the road, but frequently push over our forest reserve fences where the soil is so wet that the posts do not hold well.

FENCING SUMMARY

The following is a summary of government fencing projects started and now being completed on Hawaii:

HILO FOREST RESERVE:

Locality.	Cooperator.	Total Length in Miles.	Previous Work Completed.	Completed in July.
Punahoa 2—Piihonua...	John Ventura ..	.98	.47	.51
Kaupakuea, Lot 1.....	John Souza.....	.12	.00	.12
Honomu, Lot 17.....	V. Carrera.....	.13	.00	Posts all set.
Piha, Lots 1-4.....	W. Breithaupt...	.77	.58	900 feet more to build.
Waikaumalo	John Vieira	1.40	.00	Contract let.

OLAA FOREST RESERVE:

24 Miles	S. Kanemori	1.13	.30	Line all cleared and 171 posts cut
22 Miles	Div. of Forestry.	1.09	.00	83 posts cut and set.
22 Miles	N. Holowaty ...	2.65	.00	228 posts cut.
19½ Miles	W. H. Shipman..	2.75	.00	Begins in Aug.

In addition to these, fences are being built on the Hilo Forest Reserve boundary across the privately owned land of Punahoa 2, and across Maulua-nui.

Fence repairs were made during July by the ranger force and laborers as follows:

Kauai, Kealia Reserve by Ranger Lovell.....	.33 mile
Oahu, Lualualei Reserve by laborers.....	.52 mile
Hawaii, Olaa Forest Park Reserve, Sec. A, by Ranger Mackenzie .....	.56 mile
Hawaii, Olaa Forest Park Reserve, Sec. C, by Ranger Mackenzie .....	.07 mile

Total length of fences repaired..... 1.48 miles

TIMBER TRESPASS

Two cases of timber trespass on unreserved public land were reported to the Land Commissioner during July. One occurred on the strip of government land next to Lot 16 of the Honomu Homesteads, where one of my rangers on July 7 observed one Mariano Tavares cutting some gum trees which had been planted there. The other was personally observed in June when I found the stumps of green ohia trees cut along the belt road in Puuanahulu in North Kona. This cutting had been done by men from the Territorial prison camp, but had been stopped by the holder of the general lease of this land. My purpose in reporting the latter was to prevent a recurrence.

KAUKU ARBORETUM

During the month trees of several different species were supplied from the Hilo Nursery to Ranger L. W. Bryan for planting in the new arboretum of 13 acres which is near Kauku hill partly on the private land of Makahanaloa and partly on the government land of Kaupakuea within the Hilo Forest Reserve. On government land in this same region Mr. Bryan has recently had almost all the open land planted up to trees without expense to the Territory.

MISCELLANEOUS

Arrangements were made to have Ranger Peralto, who has not been doing entirely satisfactory work of late, work under the personal direction of Ranger Bryan. By this plan it is felt that much more efficient service will be rendered.

A day and a half was taken from my regular work to accompany Mr. Thomas Boles, the new Superintendent of the Hawaii National Park, on a trip to the summit of Mauna Loa, when I not only assisted him in making a preliminary location of the proposed road from Kilauea to the summit of the mountain but had an excellent opportunity to acquaint him with the peculiar characteristics of the native forest and explain to him the basic principles for its protection.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY, JULY, 1922

Hilo, Hawaii, August 8, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir:

The following routine report for July, 1922, is respectfully submitted:

FOREST FENCES

The entire month was spent on the island of Hawaii, chiefly in connection with fencing projects along the makai boundary of the Hilo Forest Reserve. A total of 1.7 miles of fence was completed and approved during the month, as follows:

Piihonua-Punahoa (John Ventura)	5188.7 feet
Kaupakuea Homestead Lot 1 (John Souza).....	650.0 feet
Kaiwiki-3 Homestead Lot 22 (Joe de Lima)	2219.0 feet
Opea-Peleau Homestead Lot 16 (T. de Souza)....	910.5 feet
	8968.2 feet

The wire for all of these fences was furnished by the Board of Agriculture and Forestry.

As a result of conferences with the managers of the Olaa and Hilo Sugar Companies, the fencing of the Punahoa sections of the forest boundary was undertaken during the month. When completed this fence will protect two of the most important water-heads in the Hilo Reserve. Work on this project, which includes 1.4 miles of fence, was begun on July 21, and by the end of the month 2800 feet of line had been cleared and 300 posts cut.

Posts were also being set on the Ventura section of the boundary across Punahoa, totaling 1409 feet. This fence will be completed early in August.

Incomplete and unsatisfactory fences at Honomu, Opea-Peleau and Piha, mentioned in my June report, have not yet been approved.

On July 6 proposed fence lines of the Olaa Forest Reserve were inspected, in company with the Superintendent and Ranger Mackenzie.

A visit to Ninole disclosed the fact that nothing has been done toward building the Waikaumalo fence for which wire was shipped to John Vieira, Sr., on July 12.

TREE PLANTING

Inspection showed that 175 trees (*Eucalyptus citriodora*) were planted during the month by Ranger Peralto in Piihonua along the new Ventura fence.

Mr. L. W. Bryan reports having planted, on government land, *Ficus* trees as follows: 940 in Kaupakuea, and 1000 in Honomu. On July 21, in company with the Superintendent, I visited the Kauku arboretum which Mr. Bryan started during the month on the private land of Makahanaloa at an elevation of 1600 feet. This experimental planting, in which it is planned to set out all available tree species which are likely to grow there, should ultimately become a valuable guide for future tree planting in the region.

MISCELLANEOUS

Two days were spent, with the Superintendent and Assistant Territorial Surveyor Hockley, in relocating a portion of the Waiakea Forest Reserve boundary, in order to exclude a strip of potential cane land requested for lease by the Waiakea Mill Company.

A number of photographs and some original data on the culture and curing of awa root were obtained at Seven Miles along the Volcano Road where a Korean is engaged in the industry.

At "Kalanilehua" (elevation 3800 feet), the mountain home of Mr. W. M. Giffard, measurements were made of six specimens of *Pinus muricata* which were planted in 1914. The best of these trees, which are growing under adverse conditions in a native lehua forest, was nearly 21 feet in height.

AKAKA FALLS

During the month the execution of plans was begun for the development of the scenic and recreational features of Akaka Falls, which are included in the Hilo Forest Reserve. Several guide signs were prepared and placed at the falls and along the tourist route leading mauka from the main road.

On July 31 I accompanied Governor Farrington and a number of county officials to the falls to explain our plans for the area. The chief need, aside from trails within the area itself, is the construction of approximately 1125 feet of surfaced road to enable automobiles to reach the makai end of the reservation. Such a road will eliminate the present bad foot-trail through private cane-land, which exists only on sufferance of the owner. For the building of this road financial assistance will be sought from the county of Hawaii, but the other improvements are such that they can be done by our local Ranger. A separate memorandum is being submitted setting forth these plans in detail.

Respectfully submitted,

C. J. KRAEBEL,
Assistant Superintendent of Forestry.

**REPORT OF FOREST NURSERYMAN
JULY, 1922**

August 21, 1922.

Superintendent of Forestry,
Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work done during the month of July:

NURSERY—DISTRIBUTION OF PLANTS

	Pot Grown.	Total.
Oahu—Sold	228	228
Gratis	765	765
	<hr/>	<hr/>
		993

SUB-NURSERIES

	Transplant Boxes.	Pot Grown.	Total.
Maui and Molokai	1,195	206	1,401
Kauai . . . . .	.....	236	236
Hawaii	3,200	...	3,200
			<hr/>
			4,837
Total for all islands			5,830

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of Plants, Government Nursery	\$ 5.55
Rent of Office Nursery Grounds for May and June.....	70.00
	<hr/>
Total	\$75.55

ANIMAL INDUSTRY REVOLVING FUND

Dr. L. N. Case, vaccine	\$ 21.00
A. L. C. Atkinson, vaccine	1.00
Hutchinson Sugar Co., vaccine	285.00
Hawaiian Sugar Co., vaccine	36.00
Hawaiian Sugar Co., vaccine	12.00
W. H. Rice, vaccine	28.00
W. H. Rice, vaccine	122.50
A. Mac Phee, vaccine	247.00
Dr. L. N. Case, rabies	3.00
Frank Peres, rabies	18.00
	<hr/>
Total	\$773.50

NEW FENCE

In front of the offices at the Nursery on King Street a new fence has been erected to take the place of the old dilapidated wire fence. The work was done by our own men.

U. S. GOVERNMENT RESERVE—BISHOP AND ALLEN STREETS

TREE PLANTING

According to your plan the work of planting the cocoanut and *Ficus rubiginosa* trees on the U. S. Reservation on Bishop and Allen Streets, was done the day after the filling was completed; so far the trees are doing well.

MAKIKI STATION

A new gate has been erected at the station, also some repairs done to waterpipes and the wagon man's house.

HONOLULU WATERSHED

The planting of trees amounted to 300 koa along the Ewa side of Makiki Valley near the top.

CHAULMOOGRA

Dr. Lyon of the H. S. P. A. has given us 350 *Hydnocarpus anthelminticus* seedlings.

ADVICE AND ASSISTANCE

The writer has made calls and otherwise given advice and assistance to people in and around the city, as follows:

Advice by telephone	7
Advice given people calling.....	6
Calls made	8

FOREST FIRES

About 2:30 p. m., July 11, a telephone message from the Governor's office informed us that, what was supposed to be a brush and grass fire was raging on the ridge above Pacific Heights property. The writer despatched a man in a machine to go and investigate and inform us by telephone the nature of the fire and if a gang of men was necessary. In a short time a message was received that men were not required and that with the assistance of a few Japanese already on the ground the fire could be beat out in a short time. By 6:00 p. m. the fire was entirely out. The cause of the fire, which was on the Booth Estate, was not obtained. Some of the neighbors suspected a number of boys who had passed that way early in the day in search of mountain apples, etc., as having something to do with the fire.

On July 24, Mr. Bruce Cartwright telephoned that a fire had been started on the island of Mokulua and had consumed all the vegetation on the Island. The writer called on Mr. Cartwright at his office the following morning, but no particulars in regard to the origin of the fire could at that time be obtained.

The fires which occurred on the United States Government Reservation at Schofield and the John Ii Estate, Ltd., are fully reported on by Fire Warden A. A. Wilson in his reports to you.

FIRE LINE

For the purpose of safeguarding the remaining forest cover on the upper slopes of Kaala between Maile point and Waianae pass on the U. S. Government Reserve at Schofield it was deemed necessary and very important to have a fire line laid out and kept clear just above the area used for practice. The firing of shells by the Artillery Companies, was the origin of all the fires in this section.

I accompanied the President of this Honorable Board on a visit to General Summerall at Fort Shafter in regard to the matter of forest protection. General Summerall gave his assurance that he would stop practice until the fire line was laid out and cleared; this order was carried out.

On July 22, at the request of President A. L. C. Atkinson the writer, along with Fire Warden A. A. Wilson, paid a visit to Colonel Carr at Schofield Barracks, who detached Major Dunnemiller to assist us in locating a fire line. After looking over the land very carefully we agreed on a line which was satisfactory to both parties.

The next matter was the flagging of the line, which Major Dunnemiller agreed to attend to. After the line had been flagged another visit was made by Mr. Wilson and myself and a final agreement was reached which was very satisfactory to all concerned. A blue print of the fire line and the adjoining lands will be furnished us by the authorities at Schofield when ready.

The writer was very much pleased with the cordial cooperation of Colonel Carr and his Officers.

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY

REPORT OF ENTOMOLOGIST, JULY, 1922

August 18, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:

During the month of July the insectary handled 3,900 pupae of the melon fly, from which there were bred 864 females and 720 males of *Opius fletcheri*.

The distribution of the parasites was as follows:

MELON FLY PARASITES

Opius fletcheri

		Females.	Males.
OAHU:	Dr. Bliss, Pearl City	100	100
KAUAI:	Mr. Wm. Rice, Lihue	250	250
	Mrs. Hans Isenberg, Lihue	250	250

FRUIT FLY PARASITES

Diachasma Tryoni

		Females.	Males.
OAHU:	Mr. Henry Rogers, Boyd Lane, Honolulu	100	70
	Mrs. C. M. Tai, 10th Ave., Kaimuki....	100	100
HAWAII:	Mr. L. C. Child, Kailua	200	150

Tetrastichus Giffardianus

		Males and Females.
OAHU:	Mr. Henry Rogers, Boyd Lane, Honolulu	300
	Mrs. C. M. Tai, 10th Ave., Kaimuki....	300
HAWAII:	Mr. L. C. Child, Kailua	600

Four shipments of mealy bug parasites and predators were received during the month from Mr. Osborn, the first on the 4th inst., coming from Orizaba, and the last three, on the 12th, 18th and 25th inst., respectively, coming from El Potrero. These shipments included the two species of Coccinellids and the internal parasite mentioned in last month's report. They were taken on sugar cane, pineapples and related plants and are expected to help in the control of the mealy bugs associated with these plants.

Most of the month the Entomologist was absent on vacation leave, but the work of the Division was carried on by the assistants under the direction of Mr. Timberlake of the H. S. P. A.

Respectfully submitted,

D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION

REPORT OF THE CHIEF PLANT INSPECTOR, JULY, 1922

July 31, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of July, 1922, as follows:

During the month we boarded 49 vessels, 18 of which carried vegetable matter and 6 came via the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	1898 lots	19,566 parcels
Fumigated	6 lots	6 parcels
Burned	73 lots	73 parcels
Returned	2 lots	2 parcels
Total Inspected		19,647 parcels

Of these shipments 19,206 packages arrived as freight, 326 as baggage and 115 as mail.

RICE AND BEAN SHIPMENTS

26,623 bags of rice and 408 bags of beans from the United States, and 898 bags of rice and 2623 bags of beans from Japan arrived, all clean.

PESTS INTERCEPTED

Approximately 4838 pieces of baggage belonging to immigrants from foreign countries were examined from which 23 lots of fruit and 31 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned material follows:

From China:

Cylas formicarius and *Pseudococcus* sp. in sweet potatoes, cargo.

From Japan:

Pseudaonidia trilobitiformis and *Parlatoria pergandii* on orange, baggage.

PROHIBITED MATERIAL BURNED

Oats, mail, from Australia.	Apples, baggage, from Manila.
Apples, baggage, from Australia.	Limes, baggage, from Manila.
Oranges, baggage, from Australia.	Oranges, baggage, from Manila.
Water lemons, baggage, from Australia.	Aus-Paddy rice, mail, from Manila.
Apples, baggage, from China.	Citrus naiter seeds, mail, from Manila.
Oranges, baggage, from China.	Central America, bananas, baggage, from United States.
Sandpears, baggage, from China.	
Sandpears, baggage, from Japan.	

MATERIAL FUMIGATED

Palm seeds, mail from Java, precautionary.

Tree seeds, mail from Java, precautionary.

HILO INSPECTION

Brother M. Newell, Inspector for Hilo, reports the arrival of 7 vessels with 4 carrying vegetable matter consisting of 243 lots and 1669 parcels, also 9942 bags of rice and 95 bags of beans. All were passed with the exception of two packages of bulbs. One was fumigated on account of aphid, the other burned, being badly infested with *Pseudococcus* sp.

KAHULUI INSPECTION

Mr. L. Gillin, Maui Inspector, reports the arrival of 5 vessels with 4 carrying vegetable matter, consisting of 538 packages in 18 consignments, all passed. 3835 bags of rice and 41 bags of beans were passed as free from infestation.

INTER-ISLAND INSPECTION

52 vessels; 41 with vegetable matter.

PASSED		REJECTED	
Taro	487 bags	Sugar Cane	1 pkg.
Vegetables	63 pkgs.	Plants	34 pkgs.
Fruit	315 pkgs.		
Plants	136 pkgs.	Total	35 pkgs.
Seeds	6 pkgs.		
Sugar Cane	57 cases		
Total	1064 pkgs.		

LOCAL FUMIGATION

During the month we fumigated the following:

441 bags middlings.

12 bags meal.

3 lots furniture.

Respectfully submitted,

L. A. WHITNEY,
Assistant Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

REPORT OF TERRITORIAL VETERINARIAN, JULY, 1922

August 18, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:

I beg leave to submit the following report on the routine work of the Division of Animal Industry for the month of July:

TUBERCULOSIS CONTROL

During the past month a total of 46 head of cattle were tested on the various islands, of which number 2 head were condemned and branded. Besides the above testing, autopsies were performed on 10 head of condemned cattle of which 9 head showed definite lesions of tuberculosis. In one case, a young heifer, no definite lesions of tuberculosis could be found.

INFECTIOUS AND CONTAGIOUS DISEASES.

No reported losses have occurred among the live stock of Oahu. Dr. Golding reported the loss of a few hogs in the Mana district of Kauai. An investigation into the cause of death did not establish Dr. Glaisyer's diagnosis of hog-cholera. The sanitary conditions of the premises were a replica of those obtaining in the swine-raising sections of Oahu. To say that they were filthy is to put it mildly. In the case of the pig pens which I went through in Mana, Kauai, I advised total destruction by fire, as any other form of disinfection is hopeless and absolutely out of the question.

When it comes to the question of making a proper and definite diagnosis in these cases, it must be borne in mind that the differential diagnosis of hog-cholera from the many other ills of swine, is essentially a laboratory procedure and not one of field autopsy. It is a matter of recorded fact that the original differential diagnosis of hog-cholera and swine plague or hemorrhagic septicemia, was performed in the laboratory and with the use of experimental animals. This is a fact which is generally lost sight of by the majority of practicing veterinarians.

Dr. Golding has been fully instructed in the matter of furnishing me with the necessary material for diagnostic purposes.

Occasional losses are still occurring from hemorrhagic septicemia among the cattle and horses on Maui. Dr. Fitzgerald reports, however, that he considers the outbreak has practically run its course.

No outbreaks of disease have occurred on the island of Hawaii during the past month. Dr. Rowat reports that the last death from hemorrhagic septicemia on the Parker Ranch occurred some time in May.

CONTAGIOUS EPITHELIOMA

Reports coming in from various sources, on the use of the new vaccine for sore-head in poultry, are uniformly favorable. In some instances great enthusiasm is being displayed. The vaccine as now being prepared is a high count, polyvalent vaccine; a true vaccine, not a bacterin. In certain instances it is apparently conferring a high degree of immunity in very young chickens. If it is finally definitely determined that an immunity, even though it be of short duration, is conferred by the use of this vaccine, it will mean considerable to the poultry industry of the Territory.

WEST HAWAII

Dr. Rowat reports as follows:

TUBERCULOSIS CONTROL:—"For the present month I beg to report a trip to Kohala on the 7th and 8th, making autopsies on three condemned animals, and a second trip on the 10th and 11th making three more post-mortems and finishing all of the condemned cattle at the Hawi Mill and Plantation Company.

GLANDERS:—"During the month I have been to Kohala three times and each time investigated the glanders situation without finding anything to arouse suspicion.

BOVINE HEMORRHAGIC SEPTICEMIA:—"I have been to the Parker Ranch several times during the month and reports from there are to the effect that no cases of hemorrhagic septicemia have been observed since last May."

EAST HAWAII

Dr. Elliot reports as follows:

PORT INSPECTION:—July 9, Steamship ex Enterprise, 3 crates of poultry.

July 17, Permit No. 39, Manuel Freitas, 3 cows to Honolulu.

TUBERCULOSIS CONTROL:—Hilo-Onomea Dairy, 31 head—all passed.

July 1, post-mortem examination, one cow—no lesions of tuberculosis could be demonstrated.

CONTROL OF CONTAGIOUS DISEASES:—Nothing to report.

MAUI

Dr. Fitzgerald reports as follows:

HEMORRHAGIC SEPTICEMIA CONTROL:—The outlook is much brighter than heretofore. The mortality in the various outbreaks has virtually stopped as no deaths have been reported recently and only one animal has died in a paddock that had not been visited by this disease for quite a year, however, since inoculation no further deaths have occurred in this paddock. I do not consider this a fresh outbreak, as this particular pasture has been visited by this disease several times in the past two years, but not recently.

The following animals have been immunized:

Raymond Ranch (Kahikinui)	304 cattle
Mrs. J. S. Walker	8 horses
H. W. Rice	224 cattle
H. W. Rice	28 horses

In the past month three deaths have been reported in horses, all of which upon autopsy proved to be the pneumonic type of hemorrhagic septicemia. As a result of these scattered deaths in the Kula district, I have made a trip of inspection and investigation around the island, visiting all the west Maui ranches and interrogating the owners as to their losses among horses and cattle. I found that there had been very few deaths in cattle, but for many years in some districts, it had been almost impossible to raise horses.

Respectfully submitted,

LEONARD N. CASE,
Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN

JULY, 1922

August 18, 1922.

Dr. Leonard N. Case,
Territorial Veterinarian,
Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir:

I beg to submit the following report of work performed during the month of July, 1922:

TUBERCULOSIS CONTROL

During this month 15 head of cattle were tested, of which number two reacted and were destroyed.

HOG INSPECTION

Two hogs which had died at the University of Hawaii farm were examined post-mortem. No cause of death was revealed.

These hogs had been sick for a few days and the only symptoms shown were loss of appetite and weakness of posterior quarters.

A post-mortem examination was made on one hog which had died after about a week's illness.

The cause of death was double pneumonia.

RABIES TREATMENT

Three dogs were treated with anti-rabies vaccine—one-injection method.

POULTRY DISEASES

About 500 c.c. sore-head vaccine was distributed among poultry raisers for their personal use.

Seven head of young turkeys that were badly affected with sore-head were injected with vaccine by me.

Each received 1 c.c.

LIVESTOCK IMPORTATIONS

The following livestock was received at this port:

Dogs, 3; cats, 1; poultry, 87 crates.

Respectfully submitted,

L. E. CASE,
Assistant Territorial Veterinarian.



THE HAWAIIAN FORESTER AND AGRICULTURIST

OCTOBER, 1922

CONTENTS

	Page
Editorial	223
The Tesota Bean Tree (Judd)	224
Sorehead and its Control in Hawaii (Fisher)	225
Division of Forestry	227
Division of Entomology	233
Division of Plant Inspection	234
Division of Animal Industry	235

VOL. XIX

PRICE, TEN CENTS

No. 10



ARNOLD ARBER
JAMAICA PLANTATION
MASS.



The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy ; \$1.00 a year ; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,
H. M. von Holt,

W. M. Giffard,
A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

J. P. Pico, *Forest Ranger for Waialeale Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

L. W. Bryan, *Forest Ranger for Hawaii.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villalor, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Elele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss Helen Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XX.

HONOLULU, OCTOBER, 1922.

No. 10

Progress was made during August in the many fencing projects along the Hilo Forest Reserve boundary, as may be seen by the current report of the Superintendent of Forestry.

The Plant Inspectors' records show that during August 28,510 bags of rice were imported into the Territory from the United States and 1,314 bags of rice from Japan.

A conference of all of the Territorial Veterinarians will be held in Honolulu during the latter part of November to discuss hog cholera, hemorrhagic septicemia, and other diseases of animals and their treatment.

The Superintendent of Forestry has prepared a report embodying plans for controlling the wild goat situation in the Territory which will require an appropriation from the legislature. This report will appear in the November issue of the FORESTER.

It now seems that the kauri pine tree which grows so well in these islands and promises to be a useful timber tree is not the one from New Zealand but is the *Agathis robusta*, the kauri tree of Queensland, Australia.

Attention is called to the introduction of a new and useful tree called the tesota bean from the southwestern deserts of the United States which may in time become established here and supplement the range of the algaroba.

Four more shipments of beneficial insects, consisting of tumble bugs and internal parasites and predaceous species on mealy bugs were received during August from our Field Entomologist in Mexico.

The article on Sorehead and its Control in Hawaii, which is contributed by Mr. H. F. Fisher and printed in this issue, should be of interest to all poultry raisers throughout the Territory. Mr. Fisher is owner and manager of the Fisher Poultry Farm at Keaau, Hawaii, where he specializes in heavy layers and large eggs from single comb white leghorns.

THE TESOTA BEAN TREE—A NEW TREE INTRODUCTION

By C. S. JUDD, *Superintendent of Forestry.*

The Division of Forestry of the Board of Agriculture and Forestry has lately introduced into the Territory a new tree which it is believed will prove to be a valuable addition to the island flora by supplementing the range of the algaroba, which this new tree somewhat resembles.

This tree is the Tesota bean tree (*Olneya tesota*) and it comes from the southwestern deserts of the mainland, where it is known as "desert ironwood" and "Sonora ironwood" because of the great hardness of its wood.

The tesota is a most beautiful tree. The grayish foliage and gnarled trunks give a slight similarity to the olive, but in May it is covered with an abundance of pinkish-purple leguminous blossoms. It is the largest as well as the most attractive tree that grows as a true native of the driest southwestern deserts, away from the stream beds and with full exposure to heat and drought.

The wood, which is dark, heavy and as hard as ebony, makes an excellent fuel. The tree readily ratoons from the stump and because it is deep rooted and will grow under dry conditions it is well adapted for planting in or near cultivated lands and may serve very well for hedges or windbreaks as well as for holding terraces or barriers against erosion.

Animals feed on the foliage and flowers which are nutritious like alfalfa and grow fat on them. The tree bears heavy crops of pods, not unlike those of garden beans, and each pod may have several seeds, unlike the small bony seeds of the algaroba, but of the size, appearance and texture of small peanuts and having the same agreeable flavor when roasted, so that they can be used for human consumption.

A small supply of tesota seeds was obtained in June, 1922, from the Bureau of Plant Industry in Washington, D. C. These germinated readily and now show promise of rapid growth in this climate. A few seedlings have already been planted out in several experimental plots on the dry portions of Molokai and a quantity are available for distribution from the government nursery at Haiku, Maui, for planting on that island.

The Forest Nurseryman has a few tesota seedlings left at the government nursery on King Street, Honolulu, and will be glad to distribute one or two to parties who will care for the tree and report progress on its growth.

SOREHEAD AND ITS CONTROL IN HAWAII

By H. F. FISHER

Contagious epithelioma, commonly known as chicken-pox or sorehead, has been one of the chief factors that has caused failure in poultry in Hawaii. Climatic conditions on the islands are semi-tropical, and as such, sorehead makes its appearance in chickens of all ages.

Different remedies have been advised repeatedly—some good, others not so good—but all required individual treatment, and that over a long period. Recovery was not always certain.

In 1916 the late Dr. Norgaard, former Territorial Veterinarian, made experiments at this ranch to control chicken-pox. A vaccine was used, prepared after the method employed by Dr. Beach of the University of California. The result was excellent. This method required two injections of vaccine five days apart. This was a great improvement over any other method used heretofore as a labor saver.

From a commercial standpoint the great objective is to have a vaccine that will do the work with one inoculation, and to be able to use it on chickens from seven to eight weeks of age, whether infected or not. At this age chicks are usually transferred from the brooder house to colony houses.

One can well imagine what a labor saver this method would be, as all chicks could be vaccinated as they were taken out of the crates.

Experiments that were conducted the latter part of the season of 1922 were made with the above mentioned objective. Since 1916 the loss of chickens through sorehead at this ranch has not been over three per cent, and as low as one per cent. Chicken-pox or sorehead first appears as a small blister-like nodule. As these increase in size, they become yellow, finally changing in shape and color to resemble a wart. If this growth or tumor is removed the surface will be raw, showing many small indentations. Later the surface may ulcerate and spread until a sore of half an inch in diameter is observed. The disease usually makes its appearance on the comb, wattles and skin of the head.

Experiments from June, 1922, to September, 4, 1922: Method—Hypodermic injections, subcutaneously. Point of injection to be disinfected with iodine. Care should be taken while injecting the needle under the skin not to penetrate the flesh. Experience has proven that this is usually fatal. On June 1, 1922, Dr. Leonard N. Case, Territorial Veterinarian, sent the writer a vaccine that had been prepared by him in a different manner from others sent out before this. In re-

ferring to this particular vaccine during the following experiments it will be called the vaccine of June 1 to distinguish it from other vaccines that may have been used elsewhere prior to that date. This particular vaccine gave such excellent results—in fact, beyond expectation—that it deserves special mention.

Experiment No. 1—Breed, Single Comb White Leghorns; 225 pullets, age three months. The disease was first noted on June 10, and in going over the flock it was observed that the infection was just commencing to show itself. About 20% of the pullets showed lesions on the upper and lower lids of the eye and some on the beak. The scabs were not removed; nor were they treated at all. One mil. of vaccine was injected on the left side of the bird near the keel of the sternum or that part of the breast bone near the crop. The skin is loose there and easily picked up for a subcutaneous injection. All birds were treated.

The usual second treatment, five days later, was omitted. The surprising part of this experiment was that with the one injection of vaccine the disease was checked and the infected birds made a complete and rapid recovery. Mortality none. This rapid recovery, without doubt, was due to the vaccine. Credit also must be given to the physical condition of the flock at that time as they were strong.

Experiment No. 2—Breed, Single Comb White Leghorns; 85 pullets, 55 cockerels, age 8 weeks. These chicks were treated as they were taken from the crates in being transferred from the brooder house to colony houses. Infection was light, only seven cockerels showing sorehead. Both lots of birds were inoculated with the vaccine of June 1, giving only one treatment, the dosage being the maximum 1 mil. As one can imagine, the results were closely watched. The disease was checked and recovery in the seven cockerels was rapid. Mortality none.

Experiment No. 3—Breed, Single Comb White Leghorns; 90 chicks, 6 weeks of age. Two pens, 45 to the pen. Only one bird showed infection and both pens were treated with this vaccine of June 1, using but one-half mil. One injection was given and the results excellent. Mortality none.

On September 4, 39 eight-weeks' old pullets and three eight-weeks' old cockerels and two two-months' old turkeys were treated. The pullets were free from any visible signs of infection, but the cockerels and turkeys showed fair size lesions on the combs and head. One mil. of vaccine of June 1 was given and not repeated. The results were a repetition of the three previous experiments. Mortality none.

Special attention must be called to the fact that this vaccine of June 1 was over 60 days old when used on this last experiment. With vaccine of this quality, used with ordinary intelligence, anyone raising poultry in Hawaii should be able to

control sorehead in his flocks. Bear this in mind: do not wait until your chickens are blind and emaciated and then expect the vaccine to make a quick recovery or none at all. Just as soon as you see sorehead in your flock, treat them all. Follow the directions given you and when you sterilize the needle and syringe do it well and do not be afraid to use more than one needle, remembering that one pullet is worth several needles. As far as immunity is concerned, that remains to be proven, especially with birds treated with this vaccine of June 1 that showed no signs of the disease. While the writer feels satisfied with the results obtained so far, still he does not want to go on record as saying that a positive one-treatment vaccine has been made here that will give the best results.

These experiments have not been conducted over a long enough period to prove that point.

Dr. Leonard N. Case, Territorial Veterinarian, deserves all the credit of this vaccine, as this ranch has only been the instrument of proving the value of the vaccine of June 1.

DIVISION OF FORESTRY

REPORT OF SUPERINTENDENT OF FORESTRY, AUGUST, 1922

October 5, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:

I respectfully submit the following report of the Division of Forestry for the month of August, 1922:

FOREST PLANTING

The following trees were planted during the month on three forest reserves:

Oahu—Honolulu Watershed Reserve.....	Koa	355
Waiahole Forest Reserve.....	Koa	270
	Lemon gum	189
	Blackbutt	579
	Chaulmoogra	
	(<i>Hydnocarpus</i>	
	<i>anthelminticus</i>	50
Hawaii—Hilo Reserve at Honomu.....	Port Jackson fig.....	1,000

Total number of trees planted 2,425

KAURI PINE

It has been determined that the kauri pine which grows so well in these islands is not the kauri (*Agathis australis*) of New Zealand, which has narrow and brownish leaves, but is the kauri pine (*Agathis robusta*) of Queensland, Australia, because it has the broader leaves with a bluish-green tinge. Importations of seed of the New Zealand kauri have been made in the past few years, but these have almost entirely failed to germinate. In the effort to secure seed of the Queensland kauri, a request was sent on August 31, to the government botanist at Brisbane for one pound of seed for experimental purposes. It is believed that this kauri is the coming tree of these islands for lumber production and it is unfortunate that larger quantities of local seed are not available.

MANGROVE

Arrangements were made for the shipment of two dozen mangrove plants from Molokai to Keaau, Hawaii, where Mr. Herbert C. Shipman desires to establish them in swampy land near the ocean.

FOREST FENCING

During the month while I was still on Hawaii, from which island I returned on August 22, I made inspections of fencing requirements on the boundary of the Hilo Forest Reserve where the line crosses the lands of Laupahoehoe, Waipunalei, Kahoahuna, and Humuula and on the boundary of the Olaa Forest Reserve from opposite 22 to 24 Miles.

Two days were spent in going over a proposed fence line around a heavily forested region on government leased land near the Puna Forest Reserve, which it is proposed to add to that reserve because the land is more valuable for forest than for grazing purposes.

Through the Land Commissioner the holder of general lease No. 1429 of the land of Piihonua, Hawaii, was reminded that the fence, required by the lease to be constructed on 2.24 miles of the Hilo Forest Reserve boundary, must be completed by January 10, 1923.

Similarly, the holder of general lease No. 1435 of the Waimea upper lands, was reminded that the new fence, 1.21 miles long, required by the lease to be constructed on the Puukapele Forest Reserve boundary must be constructed at once.

Progress was made during the month on the completion of the fences on the Hilo Forest Reserve boundary as follows:

Waikaumalo in cooperation with John Vieira, posts set on .70 mile.

Honomu, Lot 17, in cooperation with V. Carrera, 61 posts set.

Humuula, in cooperation with Kaiwiki Sugar Company, a new project for which a contract has been let and the line, .27 mile long, cleared.

Punahoa 2, at the southeast corner of the reserve posts have been set on .76 mile of new fence on private lands to protect the Olaa and Hilo Sugar Company flume heads.

On the boundaries of the Olaa Reserve at 24 Miles, Kanemori cut and distributed 214 posts along the new fence line which has all been cleared; Holowaty cut 81 posts during the month for his fence line; and the new fence built entirely by this Division at 22 Miles was completed on August 28, under the supervision of Ranger Mackenzie. This is 1.11 miles long and closes in a gap which will give this reserve absolute protection from stock as soon as the other fences are finished. Owing to the scarcity of large ohia trees for posts, 15 feet instead of 8 feet was chosen as the spacing interval for posts and 2 Douglas fir spreaders were used on the wires between posts. The wire and spreaders had to be packed in three miles over a very rough road and boggy trail, and it rained almost continuously during the month of construction. Large posts ranging from 6 inches to 24 inches in diameter were used and it

is safe to say that this is the most substantial fence in the whole region.

Repairs to existing fences amounting to a total length of 1.62 miles have been made on the boundaries of the Kealia Reserve, Kauai, and the Lualualei Reserve on Oahu.

FOREST FIRE

The following forest fire was reported during the month:

August 7, 1922—Waianae-uka, Oahu. A fire of unknown origin broke out at 10 a. m. and covered 800 acres, more or less, before it was extinguished the same day by soldiers and pineapple laborers. The area was covered with Hilo grass, ferns, and scattered trees and shrubs and included about 200 acres on Waikakalaua Gulch on the land of Waipio.

ENLARGING RESERVES

A start was made in enlarging the boundaries of the Honolulu Watershed Reserve, particularly on the ridge between Nuuanu and Kalihi Valleys and in the latter valley. The city is now developing water in Kalihi and it is planned to do everything possible by forest protection to conserve the water supply in that valley.

District Forester Pogue has proposed an addition of several thousand acres to the Koolau Forest Reserve on Maui and the Survey Office has been requested to prepare the necessary description of survey and map.

GOAT CONTROL

Since my return from Hawaii and after the receipt of further detailed information, I have revised my report on the control of wild goats and placed it in your hands for acceptance. The revised estimate shows that there is about one wild goat to every five acres of goat country, or an estimated total population of 68,000 wild goats on Hawaii and Maui, toward the elimination of which it would be well for the Territory to appropriate at least \$20,000.

MIKILUA ROAD

A representative of the army, who called to inquire concerning the procedure for acquiring title to the right of way for a proposed road through the Lualualei Forest Reserve from Kolekole Pass to Mikilua, was referred to the Land Office where such action is usually initiated.

KAALA TRIP

On August 30, I made the ascent of Kaala on Oahu to study forest conditions with special reference to possible damage by trail construction. The trip was made by way of Makaleha Valley and the Makaha Ridge in company with several botanists. The only damaging agency there now in the wet forest consists of a few wild pigs. Above 2,800 feet in elevation the forest cover is in prime condition with no evidence of Hilo grass invasion and to open up the forest by trail construction would, in my opinion, be a very serious mistake because of the forest deterioration that would be sure to follow.

WILD STOCK REMOVAL

Ranger Charles E. Stone reports that during August he killed 37 wild pigs and 2 wild bulls in the Kau Forest Reserve on Hawaii.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

**REPORT OF THE ASSISTANT SUPERINTENDENT OF FORESTRY,
AUGUST, 1922**

September 22, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir:

The following statement of my activities during August, 1922, is respectfully submitted:

The first part of the month was spent on the island of Hawaii; I returned to Honolulu on August 19.

HILO FOREST RESERVE

Inspections on August 7 and 9 of the southeast corner of this Reserve, from Kahoama Stream to the Olaa waterhead and the Wailuku River, failed to discover any cattle or fresh signs of cattle in that portion of the Reserve. A pipe was set on the east bank of the main Wailuku River, opposite the confluence of Hookelekele Stream, for the purpose of making this portion of the Reserve boundary more definite.

A small sketch map of this region was prepared, under date of August 15, and on a scale of 1 inch to 1000 feet, for the purpose of showing the ownerships and leases of adjacent lands, the status of fences on the forest reserve boundary, and particularly the relation of Kahoama Stream to the south channel of the Wailuku River. This south channel is actually a "flood-water meander" of the main Wailuku and, except in flood times, has only a small trickle of water in its bed. Copies of this map were furnished the Territorial Sanitary Engineer and the Hawaii County Engineer with suggestions regarding the development of an adequate water supply for the city of Hilo by tapping the Wailuku River within the Hilo Forest Reserve. The relation of the Hilo Reserve to the city water supply was discussed at some length with the county officials on August 8.

On August 9 the mauka fence of John Ventura's lease in Punahoa, co-incident with 1277 feet of the Hilo Forest Reserve boundary, was inspected and approved. Although not constructed in accordance with our standard fence specifications, this fence was approved because it is a strictly private fence and was constructed of four barbed wires in a manner believed to be stock-proof under ordinary conditions. More frequent inspection of such a fence will be required than of our standard fences.

Three days were spent on the Akaka Falls project, finding and marking corners, locating new trails, and preparing a sketch map of the area on a scale of 1 inch to 250 feet. On a considerable portion of the area which is densely overgrown with staghorn fern, it is proposed to plant Moreton Bay fig trees for the purpose of shading out this vicious pest and making the area accessible.

BOY SCOUT PLANTING PROJECT

A conference with Mr. E. C. Houston, Boy Scout Executive of Hawaii Island, and Mr. Otto Hornung, a local troop leader, resulted in a plan for enabling local Scouts to get forestry experience by planting trees in designated areas in the southeast corner of the Hilo Forest Reserve. This work is expected to begin in October under the supervision of our local Ranger.

OTHER RESERVES ON HAWAII

On August 16 the point at which the Volcano Highway enters the Panaewa Forest Reserve was marked with cloth notices and with a painted sign bearing the name of the reserve.

On the same day three corners of the Keaouhana Forest Reserve were permanently marked with pipes, the boundary along the Kalapana road was marked with cloth notices, and a painted sign bearing the name of the reserve was placed at the Kehena road junction.

One day was spent with the Assistant Territorial Surveyor upon the Waiakea Forest Reserve boundary relocation.

HILO FOREST RESERVE WORKING PLAN

Most of the month, after my return from Hilo, was spent on the compilation of boundary data to be included in the comprehensive working plan of the Hilo Forest Reserve. This table shows, for the entire boundary, the lands within the Reserve, ownership and use of all land adjacent to the Reserve, the length of boundary not requiring fence, length of fence existing and the length of boundary still requiring fence.

PUU KAALA TRIP

On August 30 I accompanied a party of scientists on a trip to Puu Kaala in the Waianae Range, Oahu. Besides the guest of honor, Dr. Carl Skottsberg of the Gothenberg Botanical Garden, Sweden, the party included Mr. Albert Judd of the Bishop Museum, Dr. Lyon, Mr. Caum and Mr. McEldowney of the H. S. P. A. Experiment Station, Mr. Griffin, horticulturist, and the Superintendent of Forestry. Numerous specimens were gathered for Dr. Skottsberg's collection and an undescribed fern was found by himself and Dr. Lyon.

Ascent was made from the north side where the native forest, above 2800 feet elevation, was found to be in excellent condition and entirely free from Hilo Grass or other objectionable introduced plants. Among the notable features of the flora were an area of five or six acres on a steep slope near the summit densely overgrown with giant leaves of the ape-ape plant, and a complete forest cover in the shallow summit crater composed largely of olapa and ohia lehua trees. The trunks of the trees at the summit, the branches of all the shrubs and lesser growth, and the very ground itself were heavily shrouded in a luxuriant growth of dripping moss, saturated by the almost incessant fog and rain.

Respectfully submitted,

C. J. KRAEBEL,
Assistant Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN AUGUST, 1922

September 20, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work done during the month of August:

NURSERY—DISTRIBUTION OF PLANTS

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Oahu—Sold .....	...	...	341	341
Gratis	2500	100	1634	4234
				<hr/> 4575

SUB-NURSERIES

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Maui and Molokai .....	...	150	...	150
Kauai .....	...	...	285	285
Hawaii	1000	3000	365	4365
				<hr/> 4800
Total for all Islands.....				9375

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of plants.....	\$7.95
Sale of one Oakland automobile belonging to Animal Industry..	110.00
	<hr/>
Total	\$117.95

FOREST RESERVES—TREES PLANTED

Waiahole Forest Reserve; Koa	270
Waiahole Forest Reserve; Eucalyptus pilularis and citriodora	750
Waiahole Forest Reserve; Chaulmoogra	50
	<hr/>
Total	1070

ANIMAL INDUSTRY REVOLVING FUND

Hilo Sugar Company, serum	\$ 2.25
Parker Ranch, serum	141.75
Dr. Elliot, serum	2.00
Kula Sanitarium, serum	38.00
	<hr/>
	\$184.00

MAKIKI STATION

The work done at Makiki Station consisted of the regular routine with the addition of some repairs to our water system and roads.

HONOLULU WATERSHED

The work done on the watershed consisted of clearing trails and clearing off for planting; 355 koa trees were planted on the lower ewa slopes of Makiki Valley near the top of the main valley.

The writer made the following calls and otherwise gave advice and assistance as follows, at the request of people in and around the city:

Calls made	7
Advice given people calling	6
Advice given people by telephone.....	3

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY

REPORT OF ENTOMOLOGIST, AUGUST, 1922

September 21, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:

During the month of August the insectary handled 3,200 pupae of the melon fly, from which there were bred 929 females and 927 males of *Opius fletcheri*.

The distribution of parasites was as follows:

MELON FLY PARASITES

Opius fletcheri

KAUAI—Mr. Wm. Rice, Lihue.....	250 females	250 males
Mrs. Hans Isenberg, Lihue.....	100 females	100 males

Diachasma Tryoni

OAHU—Mr. Henry Rogers, Boyd Lane.....	100 females	100 males
Mrs. Wall, Nuuanu Avenue.....	100 females	100 males

Diachasma Fullawayi

OAHU—Mrs. Wall, Nuuanu Avenue.....	40 females	30 males
------------------------------------	------------	----------

Opius humilis

OAHU—Mr. Henry Rogers, Boyd Lane.....	50 females	50 males
---------------------------------------	------------	----------

Tetrastichus Giffardianus

OAHU—Mr. Henry Rogers, Boyd Lane.....	400 males and females
Mrs. Wall, Nuuanu Avenue.....	500 males and females

The Entomologist was occupied mostly attending to beneficial insects sent from Mexico by H. T. Osborn. Four shipments were received during the month of August, on the 9th, 15th, 23rd and 29th, instants, respectively, which consisted principally of internal parasites and predaceous species on mealy bugs, although one consignment of tumble bugs was also made. These were liberated, while the other beneficial insects were held in quarantine until their adaptability to our species of mealy bugs could be determined, and their multiplication effected. Three species of Coccinellid beetles (lady birds) have been successfully reared, and liberations made from the emergence.

Respectfully submitted,

D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION

REPORT OF CHIEF PLANT INSPECTOR, AUGUST, 1922

August 31, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:

I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of August, 1922, as follows:

During the month we boarded 49 vessels, 21 of which carried vegetable matter and 7 came via the Canal. The following disposal was made of the various shipments:

Passed as free from pests.....	2605 lots	35,577 pkgs.
Fumigated	2 lots	2 pkgs.
Burned	102 lots	102 pkgs.
Total inspected		35,681 pkgs.

Of these shipments 35,291 packages arrived as freight, 254 as baggage and 136 as mail.

RICE AND BEAN SHIPMENTS

16,890 bags of rice and 432 bags of beans from the United States, and 1314 bags of rice and 3032 bags of beans from Japan arrived, all clean.

PESTS INTERCEPTED

Approximately 5578 pieces of baggage belonging to immigrants from foreign countries were examined from which 33 lots of fruit and 61 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above-mentioned material follows.

From Japan:

Moth larvae, beans, mail.
Bruchus pisorum, beans, mail.

From the United States:

Pseudococcus citri, on coleus, baggage.
Pheidole sp. (?), ship's vegetable locker.

PROHIBITED MATERIAL BURNED

Cuttings, baggage from Canada.
Plant, baggage from Japan.
Green pine leaves, baggage from Japan.
Paddy rice, baggage from Manila.
Citrus seed, mail from Manila.
Green corn, baggage from United States.
Central America bananas, baggage from United States.

MATERIAL FUMIGATED

Beans, mail from Japan, infestation.
Tree seeds, mail from Manila, precautionary.

BENEFICIAL INSECTS

Four packages of beneficial insects arrived from Mexico during the month and were turned over to Mr. Fullaway for disposition.

HILO INSPECTION

Brother M. Newell, Inspector at Hilo, reports the arrival of 7 vessels with 4 carrying vegetable matter consisting of 254 lots and 2292 parcels. One lot of wormy turnips was destroyed and 6310 bags of rice and 115 bags of beans arrived from the United States and 547 bags of beans from Japan.

KAHULUI INSPECTION

Mr. L. Gillin, Maui Inspector, reports 7 vessels arriving with 2 carrying vegetable matter consisting of 18 lots and 827 parcels. Shipments of 5310 bags of rice and 49 bags of beans were passed from the United States.

INTERISLAND INSPECTION

Taro	397 bags	
Vegetables	52 pkgs.	
Fruit	306 pkgs.	
Plants	84 pkgs.	REJECTED
Seeds	7 pkgs.	
Pine shoots	1072 bags	Plants
Sugar cane	45 cases	11 pkgs.
Passed	1963 pkgs.	

LOCAL FUMIGATION

During the month we fumigated the following for various merchants:

114 sacks of rice.	4 lots furniture.
325 sacks mixed grain.	1 lot books.

Respectfully submitted,

L. A. WHITNEY.
Assistant Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

REPORT OF TERRITORIAL VETERINARIAN, AUGUST, 1922

September 22, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:

I beg to submit the following report on the work of this Division for the month of August, 1922:

TUBERCULOSIS CONTROL

The following cattle were tested on Oahu during the past month:

	Total.	Passed.	Condemned.
Harry Oneha	1	1	0

CONTAGIOUS EPITHELIOMA OR SOREHEAD

During the month 20 head of turkeys were vaccinated at the Lunalilo Home for sorehead, a complete recovery being effected. Reports coming in from various sources, indicate considerable success from the use of this new vaccine.

EQUINE BOTULISM OR FORAGE POISONING

In response to a telephone call from Laie Plantation Company, an investigation was made of a disease occurring among their work animals.

A few weeks before three fatal cases had occurred among the horses in one of their stables, but not reported. The animals went off feed, became partially paralyzed and died in a short time. On the death of the fourth case following similar symptoms, this office was notified and a post-mortem made. Nothing very definite was observed on autopsy although a few lesions were found which would seem to indicate hemorrhagic septicemia.

Three days later another animal became affected. Upon being notified, I left for Laie at once and upon arrival found the following conditions:

The subject was a large grey draft horse about eight years old and in good flesh, which was down and unable to rise, being in a more or less paralyzed condition in the hind quarters. The history of the case as derived from the owners, was to the effect that the horse had been all right up to the day previous, when it was noticed that the feed was not cleaned up as usual. On the following morning the animal refused all feed and finally went down and was unable to rise.

An examination of the animal disclosed a pulse rate of 70 and a temperature of 103.2 degrees. There were no symptoms of pain. Ineffectual attempts to get up had caused a number of abrasions of the skin about the head and legs.

In the way of treatment, rectal injections of soap and water were given and 1 gr. of arecolin hydrobromide was administered in order to effect as thorough a cleaning of the intestinal tract as possible. Instructions were given in regard to diet.

This animal made a complete recovery.

An examination of the feed revealed a mouldy condition of the barley, which was also considerably contaminated with smut. To all appearances, this particular shipment of barley was of poor grade and must be considered the source of the trouble.

BOVINE HEMORRHAGIC SEPTICEMIA

On August 22, I was called in consultation by Dr. W. T. Monsarrat and to make a post-mortem examination on a cow which had died rather suddenly in one of the local dairies. A very complete autopsy was performed and a diagnosis of hemorrhagic septicemia made. The remaining cattle in this herd, 37 in all, were vaccinated, which checked the progress of the disease in the dairy herd entirely. A few days later a mule at the same dairy suddenly died and a diagnosis of hemorrhagic septicemia made upon autopsy. The remaining mule was given 100 mil. of bovine serum. No further deaths have occurred.

As a precautionary measure, the cattle and horse stock in several nearby dairies were vaccinated; a total of 36 head thus being treated.

CANCER OF THE HEAD

At the instance of the Humane Society, a trip was made to Kailua to examine a horse which was thought to be suffering from an infectious disease. Upon examining the animal it was found to be suffering from cancer of the soft palate and facial sinuses. Due to the pressure exerted by the external growth of the cancer, the facial sinuses were bulging to a considerable extent and, due to pressure necrosis, the facial bones were so soft as to be easily cut with a pen-knife. The internal growth of the cancer was causing a slow strangulation through pressure on the larynx and trachea.

The animal was destroyed and the head taken to the laboratory for preservation.

LIVE STOCK IMPORTATION AND PORT INSPECTION

Beginning with the first of August, a new and far more efficient system of port inspection was inaugurated, which has been conducive of good results from the start. With the placing of a man on the water-front whose entire time will be given to this work, all vessels entering this port will be promptly inspected and the regulations of this Division properly enforced.

The Live Stock Inspector reports that during the past month a total of 78 vessels were boarded and inspected by him, of which number the following carried live stock for this Territory:

Aug. 1—	S. S. Maui	San Francisco
	1 Pointer pup	J. M. Spalding
Aug. 2—	S. S. Hyades	San Francisco
	24 mules	Schuman Carriage Co.
	2 crates poultry	Hawaiian Sugar Co.
Aug. 5—	S. S. Manuwai	San Francisco
	444 hogs	Schuman Carriage Co.
	18 mules	Schuman Carriage Co.
Aug. 8—	S. S. Wilhelmina	San Francisco
	1 Setter pup	Dr. Cyril Golding
	1 white Spitz	Mrs. H. A. Baker
	98 crates poultry	Various
Aug. 15—	S. S. Matsonia	San Francisco
	1 Airedale	A. R. X. Co. (H. E. Herzog)
	1 crate poultry	A. R. X. Co. (H. E. Herzog)
Aug. 21—	S. S. Sonoma	San Francisco
	23 crates poultry	Various
Aug. 22—	S. S. Siberia Maru	San Francisco
	1 crate poultry	Fred Marquese
Aug. 23—	S. S. Manoa	San Francisco
	242 crates poultry	Various

In connection with the importation of dogs and to facilitate compliance with our regulations and for the information of dog owners and importers as to what certificates and affidavits are necessary if they desire to have their dogs vaccinated before shipment to Hawaii, the attached combination form of certificate and affidavit is being gotten out. These blank forms will be on file at my office and with a certain number of Coast Veterinarians.

EAST HAWAII

Dr. Elliot reports as follows:

PORT INSPECTION—S. S. Enterprise...San Francisco
 1 horseT. H. Davies & Co.
 4 horsesC. Brewer & Co.
 1 crate poultry

BOVINE HEMORRHAGIC SEPTICEMIA.—At Mountain View, Olaa, 13 deaths from this disease occurred among cattle. Fifty-one head of in-contact animals were vaccinated and no further cases have been reported.

One case occurred in the Hilo-Onomea dairy and 31 head of in-contact animals were vaccinated. No further deaths have occurred. These cattle were previously vaccinated twice during the month of May.

Three deaths occurred in the dairy of John Souza, Pepeekeo and 18 head of in-contact animals were vaccinated with no further loss. In this outbreak, diagnosis was uncertain in the absence of post-mortem examination, but no other possible cause could be ascertained.

WEST HAWAII

Dr. Rowat reports as follows:

GLANDERS:—Continued inspections in the Kohala district have so far failed to reveal any cases of glanders.

BOVINE HEMORRHAGIC SEPTICEMIA:—No cases of this disease have occurred in this district during the past month. At the Parker Ranch everything is going along nicely, no outbreaks having occurred since last May.

CONTAGIOUS EPITHELIOMA:—Mr. J. K. White of Kohala, reports splendid results from the use of the "New Process" sorehead vaccine in the treatment of roup in his chickens. He says, "where formerly I raised only a few out of a hatching, I now save nearly the whole flock."

MAUI

Dr. Fitzgerald reports as follows:

BOVINE HEMORRHAGIC SEPTICEMIA:—Only two deaths have been reported during the month and these in very young calves which had not been vaccinated. As the carcasses were burned up before being reported, thus giving no opportunity for autopsy, there was some doubt as to whether these deaths were due to hemorrhagic septicemia.

During the month the following animals were vaccinated.

Haleakala Ranch—511 head, combination vaccination with hemorrhagic septicemia bacterin and blackleg filtrate.

Harold W. Rice—280 head, single vaccination with hemorrhagic septicemia bacterin.

KAUAI

No report.

Respectfully submitted,

LEONARD N. CASE,
 Territorial Veterinarian.

**TERRITORY OF HAWAII
BUREAU OF AGRICULTURE AND FORESTRY
DIVISION OF ANIMAL INDUSTRY**

C E R T I F I C A T E

I HEREBY CERTIFY, That the following described dog:
Breed..... Age..... Sex..... Color..... has passed
a careful veterinary examination and is apparently free from all dis-
eases of an infectious or contagious nature communicable to the canine
species and further certify that the above described dog was given the
(Hoyes Method)
.....antirabic vaccination on the day of
(One Injection Method)
.....using a vaccine prepared by the laboratories
and that said dog was kept under observation for.....days subse-
quent to treatment.

Dated thisday of

.....
Veterinarian making inspection and vaccination.

Approved:

B. A. I. Inspector or State Veterinarian.

A F F I D A V I T

(Owner)

I, (Importer) of the dog above described, to be
shipped from, County of, State of and
consigned to, Territory of Hawaii, do solemnly swear that
the above certificate refers to the dog in question and that all regula-
tions of the Board of Commissioners of Agriculture and Forestry govern-
ing this importation have been fully complied with.

.....
Owner or Importer.

Subscribed and sworn to before me this.....day of

.....
Notary Public.

R E P O R T O F

ASSISTANT TERRITORIAL VETERINARIAN AUGUST, 1922

September 26, 1922.

Dr. Leonard N. Case,
Territorial Veterinarian,
Board of Agriculture and Forestry,
Honolulu, T. H.

Dear Sir:

I herewith submit a report of the work done during the month of
August, 1922:

SOREHEAD VACCINATION

Seven young turkeys at Lunailo Home were given a second vaccination with sorehead vaccine. Their condition at this time was much improved.

INSPECTIONS

An inspection of pig pens in the Moiliili district to determine the sanitary condition of pens and housing and health of hogs was made.

In general the hog houses are satisfactory as far as the cement floors and partitions are concerned, but the superstructure in many cases is poor, making the pens very dark and not giving access to sunlight.

In response to a call from Laie Plantation I made a trip to the plantation to investigate the cause of death of one bay mare that had died that morning.

A post-mortem examination was made, but no definite conclusions reached.

RABIES TREATMENT

J. M. Spalding	1 dog
Mrs. H. W. Baker	1 Chow dog
Lt. H. E. Herzog	1 Airedale

LIVE STOCK IMPORTATIONS

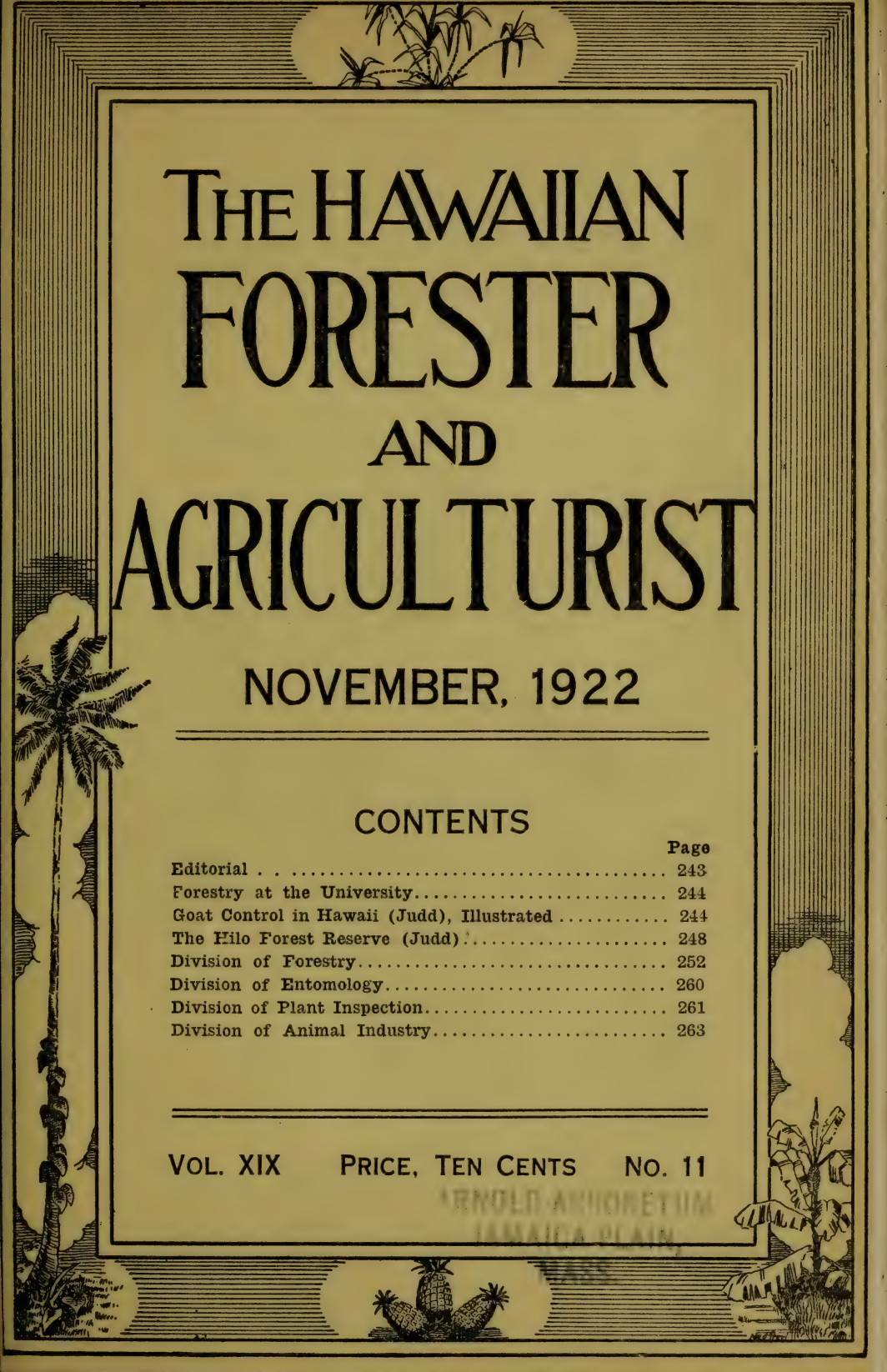
S. S. Maui—	
J. M. Spalding	1 wire hair pointer
S. S. Hyades—	
G. Schuman	24 mules
Hawaiian Sugar Company	2 crates poultry

Inspection of live stock at Honolulu port, was taken over by Mr. Joseph Richards after August 2, 1922.

On August 21, I started my vacation of three weeks returning on September 11, 1922.

Respectfully submitted,

L. E. CASE,
Assistant Territorial Veterinarian.



THE HAWAIIAN FORESTER AND AGRICULTURIST

NOVEMBER, 1922

CONTENTS

	Page
Editorial	243
Forestry at the University	244
Goat Control in Hawaii (Judd), Illustrated	244
The Hilo Forest Reserve (Judd)	248
Division of Forestry	252
Division of Entomology	260
Division of Plant Inspection	261
Division of Animal Industry	263

VOL. XIX

PRICE, TEN CENTS

No. 11

ARNOLD ARBORETUM
JAMAICA PLAIN,
MASS.

The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy; \$1.00 a year; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1922)

COMMISSIONERS.

A. L. C. Atkinson, *President.*

J. M. Dowsett,
H. M. von Holt,

W. M. Giffard,
A. H. Rice

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

Charles S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

Charles J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*

Joe Rita, *in charge of Sub-Nursery at Kalaheo, Kauai.*

J. P. Pico, *Forest Ranger for Waiaae-kai Reserve, Oahu.*

Hosea K. Lovell, *Forest Ranger for Kauai.*

A. J. W. Mackenzie, *Forest Ranger for Hawaii.*

James Lindsay, *Forest Ranger for Maui, and in charge of Sub-Nursery at Haiku.*

Antone P. Aguiar, *Forest Ranger for Panaewa Reserve, Hawaii.*

Charles E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

H. K. Stender, *Forest Ranger for Kohala Mt. and Hamakua Pali Reserve, Hawaii.*

Lawrence L. Peralto, *Forest Ranger for Hilo Forest Reserve.*

V. L. Ellis, *Forest Ranger at Large.*

L. W. Bryan, *Forest Ranger for Hawaii.*

DIVISION OF ENTOMOLOGY.

David T. Fullaway, *Entomologist.*

Quan Chew, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION.

Edward M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Quarantine Inspector and Laboratory Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector at Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector at Elele, Kauai.*

G. C. Munro, *Honorary Plant Inspector at Manele, Lanai.*

Mrs. Ruth Cooley, *Inspectors' Clerk.*

DIVISION OF ANIMAL INDUSTRY.

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

Joseph Richard, *Livestock Inspector.*

CLERICAL STAFF OF BOARD.

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss Helen Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX. HONOLULU, NOVEMBER, 1922.

No. 11

Forestry is now being taught at the University of Hawaii, the present instruction being given to seniors and juniors during the first semester.

The necessity for government assistance in putting a stop to the damage done by wild goats on Hawaii and Maui is pointed out in a special report printed in this issue.

The Division of Forestry is putting into operation the new law in regard to the removal of cattle from forest reserves which was passed by the last legislature as Act 222.

Some interesting results should be obtained from the dry-land arboretum recently established at Mikilua, Oahu, in the determination of what species of newly-introduced trees will grow best in similar dry situations

Progress in fencing the makai boundary of the Hilo Forest Reserve is indicated in the current report of the Superintendent of Forestry and it is hoped that this project will be completed by the end of the year. A full description of the work done this summer in this reserve is printed in this number.

In order to keep up to the progress of the times, changes have to be made occasionally in forest reserve boundaries not only to make agricultural land available for the higher use of producing crops but also to give protection to forests on additional areas where it is important that water supplies should be conserved.

An inspection made during September by the Territorial Veterinarian of 126 piggeries in and around Honolulu showed that, although of the total of 7480 pigs examined not one sick animal was seen, there is much which should be done to improve the sanitary conditions under which these pigs are raised if losses are to be prevented in the future.

FORESTRY AT THE UNIVERSITY.

On account of the dependence of the main agricultural industry of these islands on a steady flow of water, the protection of the forests which conserve this water is a territorial necessity. It has been planned for some time to impress this upon the students at the University of Hawaii but not until this year has any regular instruction in forestry been given.

As a temporary expedient, the course is being first presented by the Superintendent of Forestry and his assistant who have undertaken the work in addition to their regular official duties in the hope that several of the students will be attracted to forestry and sufficiently trained to take up forest work as rangers, for which position qualified young men of the proper temperament are not available in the islands.

The course, which will be given only during the first semester, from September 13, 1922, to January 15, 1923, includes 34 lectures and 17 field periods and covers the history of forestry, forest protection, forest mapping, dendrology, forest planting, silvics, and forest mensuration.

Mr. Judd has the lecture hour at 9 a. m. on Mondays and Mr. Kraebel the same hour on Wednesdays. Field work, which is given by each on alternate Monday afternoons, embraces actual nursery work and tree planting, height, diameter, and volume measurement of trees, mapping of woodlands by use of telescopic alidade and plane table and by traverse board and open-sight alidade, and the identification in the field of native and introduced trees.

Fourteen students of the senior and junior classes who are taking instruction in sugar technology are enrolled in this course in forestry.

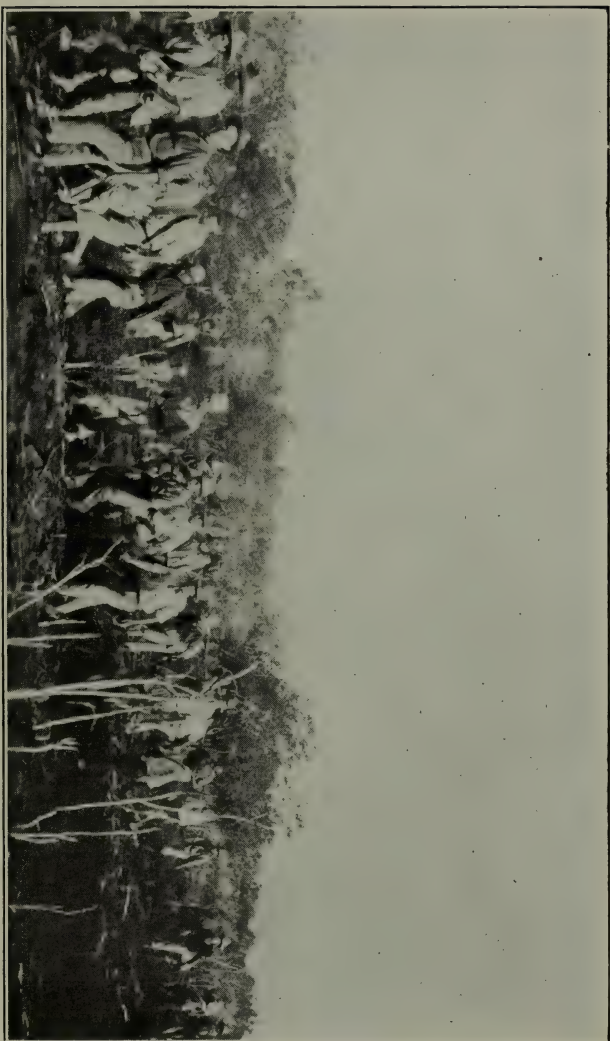
C. S. J.

GOAT CONTROL IN HAWAII.

By C. S. JUDD, *Superintendent of Forestry.*

The damage done by wild goats to natural forage and to forest growth in the Territory of Hawaii is well known and the necessity of controlling the increase of the wild goat population is especially recognized with good reason by ranchers who see their cattle being deprived of the feed on grazing lands which at their best are none too productive of nourishing cattle feed.

The desire to get rid of the goats has been ever present but the expense of extermination or control, the small remuneration derived from the goats, and the fact that goats are nomadic and hence menace more than one ranch, have tended to prevent the individual rancher from waging a war of extermination upon



Some of the one hundred and seventy Boy Scouts proceeding to the driving line in Puunahulu, North Kona, Hawaii, on June 26, 1922.

this pest. The recent rapid increase in the wild goat population is ascribed to the absence of wild dogs which, before they were killed off by the ranchers for obvious reasons, kept down the number of goats.

Niihau was entirely cleared of goats some years ago and recently Kahoolawe was similarly freed of this pest by a requirement in the government lease of this island. The goat population on Kauai has been held down to a minimum mostly by pot hunters who depend largely upon this animal for meat and on Oahu wild goats are becoming extremely scarce because of frequent hunting by soldiers and sportsmen. On Lanai and Molokai the goats are held in check by the ranchers but this work must continue if the goats are to be properly controlled.

In sections of Maui and Hawaii, however, the wild goats seem imperceptibly to have gotten ahead of the ranchers and today constitute a real and serious menace, of which only a few are fully aware. Not only are thousands of acres robbed of valuable forage grasses which should properly go to the cattle for the meat supply of this Territory, but the undergrowth of bushes, ferns, and herbaceous plants which form valuable ground cover is being entirely consumed or destroyed by goats and the trees which form the complement in the scheme of water conservation are being barked and killed by this voracious pest. At Kiholo in North Kona almost every algaroba tree, established in this dry region with great difficulty and most valuable here for the production of forage beans, has been girdled by the wild goats.

Ranches which have had topographical advantages and have been able to develop their fencing plans are comparatively free from this pest but other ranches, particularly on the summit slopes of Haleakala on Maui and on the upper slopes of Mauna Loa on Hawaii, which have large reaches of rough country, which harbor goats, are now realizing the great damage which is being done, have recognized the need for early action, and have appealed to the Territorial government for assistance.

The Board of Agriculture and Forestry is charged by law to rid the forest reserves of live stock and this seems to be the natural organization to take up the work of goat control, for the goats wander indiscriminately from forest to grazing lands and vice versa.

The rancher can not be held entirely responsible for keeping his own lands free from wild goats because of the nomadic habits of this beast and therefore asks for government aid with some justification. On the other hand, his lands are benefitted by goat extermination and for this reason the government should not be expected to assume the entire responsibility and cost of this work. It should be a cooperative business in which the land holder and government meet each other half way.

Senator R. Hind of Puuwaawaa, North Kona, Hawaii, is one who has felt, probably the most seriously, losses from an overpopulation of wild goats and in addition has suffered much loss

of forage for cattle from wild sheep. It has unfortunately not been possible to satisfy his appeals for government aid in goat control at the present time because the Territory has as yet appropriated no money for this worthy purpose. He has, therefore, undertaken, on his own initiative, active measures to relieve his ranch of this pest and on June 26 and 27, 1922, conducted a drive which resulted in ridding his ranch of 7,000 wild goats.

An attempt made through the Governor to secure from the Commanding General 100 soldiers of the regular army to assist on this drive, met with no results on the ground that it was not expedient to grant the request, but the eleven volunteer marines who came up from Pearl Harbor did good work and during the few days before the drive benefitted the land by shooting 100 wild sheep.

The bulk of the drivers consisted of boy scouts from the Kilauea Council (embracing the Island of Hawaii) and the drive was worked in as the main feature of the scouts' annual encampment. Besides the 176 scouts and 14 officials, there were approximately 35 cowboys and volunteers, making a total personnel of 225 drivers.

An area of about 17,000 acres was covered in this drive, which yielded 7,000 goats. On the whole ranch which consists of 126,155 acres, it is estimated from careful observations made on the drive that the goat population before the drive was 21,000. This gives the basis for an estimate of one wild goat for every 5 acres of goat bearing land.

The following table gives a list of lands and acreages where wild goats are a pest and where radical steps should be taken to eliminate them:

	Acres
<i>Hawaii</i> —	
Puuwaawaa and Puuanahulu.....	105,000
Kaupulehu to Kealakekua.....	40,000
Honaunau to Kahuku.....	60,000
Kau Desert	40,000
Kapapala, mauka Keauhou, Waiakea and Humuula	75,000
<i>Maui</i> —	
Haleakala Crater and upper slopes.....	20,000
Total	<u>340,000</u>

Assuming that these areas are populated with wild goats at the rate of one goat to every 5 acres we have then an estimate of 64,000 wild goats on Hawaii and 4,000 wild goats on Maui, or a total of 68,000 wild goats which it would be well for the Territory to get rid of before they cause any further destruction.

The goat drive on the Puuwaawaa Ranch was conducted mostly by volunteers, but the expense of transportation and food amounted to approximately \$1200.00. This gives about 17 cents each as the cost of driving in the 7,000 goats. If the



Some of the seven thousand wild goats driven onto the sand spit at Kiholo by the Scouts and cowboys on the following day.

drivers had been paid \$5.00 per day for the two days of actual driving (not too high a wage for the hard work encountered) the cost of driving in these goats would have been about 50 cents each.

To get rid of the estimated population of 68,000 wild goats in the Territory, the sum of at least \$34,000.00 will be needed, if goat drivers are to be hired as most likely they would have to be and probably the sum of \$40,000.00 would finally be needed in order to allow for the construction of wing fences which would greatly facilitate driving.

Of this sum of \$40,000.00, at least \$20,000.00 or more should be contributed by the Territory for reasons already given. This amount would be money well spent for the benefit of the Territory.

It is suggested that a saving could be made, if the enlisted men in the National Guard of Hawaii could be used on the drives. They are already well equipped with canteens and shoes, the two requisites most needed in driving goats, and their field kitchens and other camping equipment could be used to the greatest advantage in this work. A well-conducted goat drive, where the moving line is held adequately with men properly spaced at intervals simulates actual warfare and would give the national guardsmen excellent field practice and at the same time their services would result in real benefit to the Territory.

It is believed that the cheapest and surest way to get rid of these wild goats is first to conduct well-organized drives aided by wing fences and to follow up the goat extermination by the employment of expert hunters. In the drives, the owner or controller of the land should cooperate by bearing a part of the expense.

CONCLUSION.

1. Wild goats are a serious menace to the Territory and should be eliminated by early and drastic action.

2. To get rid of the estimated population of 68,000 wild goats on Hawaii and Maui at least 50 cents per goat or probably \$40,000.00 will be needed. Of this amount the Territory should contribute the larger share.

3. Operations for goat control should be limited to drives followed up by extermination by expert hunters employed by the Territory.

4. The Board of Agriculture and Forestry is the logical organization to handle this work and should at the next session of the Legislature be given an appropriation of \$20,000.00 for goat control work, subject, however, to an equal sum being contributed or guaranteed by the graziers concerned.

5. With this appropriation there should be passed a law authorizing this Board—

- (1) To cooperate with the owners or controllers of private land in driving goats, said owners or controllers to pay for a fair share of the cost of each drive.

(2) To hire expert hunters if found necessary to exterminate goats.

(3) To arrange if possible with the military to aid and cut down expenses.

(4) To purchase fencing material, fire-arms, ammunition, shoes, camping equipment, and other material needed for goat extermination.

(5) To sell such equipment and with the proceeds purchase new material in other places.

THE HILO FOREST RESERVE.

By C. S. JUDD, *Superintendent of Forestry.*

The Board of Agriculture and Forestry has recently completed a splendid piece of field work on the island of Hawaii, which will result in putting the Hilo Forest Reserve into a condition of far better protection than has hitherto been possible.

This reserve consists of a vast jungle on the windward slopes of Mauna Kea and covers 111,750 acres between the elevations of 2,000 and 6,000 feet above sea level. Its importance as a water producing forest may readily be understood when it is known that eleven sugar plantations, from Olaa to Kaiwiki, depend upon the water from this reserve for their existence. These eleven plantations during the ten years up to 1922 produced 1,152,068 tons of sugar or one-fifth of the total sugar output of the Territory. The water, so essential to the operations of these plantations, is used mainly for fluming cane to the mills, but also in the process of sugar manufacture, and for domestic purposes in the camps and villages where the laborers reside. The town of Hilo also depends upon the water which originates from this reserve to supply the increasing demands of its population and now contemplates taking an additional supply from the Wailuku River within the reserve.

There are one hundred waterfalls along the makai boundary of this reserve, some of them such as Akaka Falls having a straight drop of 420 feet, and every stream of any importance on the island of Hawaii, with the exception of the Kohala Mountain region, has its source in this one forest reserve.

The native forest in this reserve is fairly uniform and the combination of trees, tree ferns and smaller ferns, shrubs, vines, low-growing plants and mosses is ideal for the conservation of water so long as it is protected from damage by stock and other agencies and is allowed to thrive undisturbed. The predominant tree is ohia lehua, which attains huge proportions in many parts of the reserve. On the well drained ridges and particularly toward the upper edge of the reserve koa trees are found, many of them growing to enormous sizes. In smaller numbers and

sizes are found the kopiko, olapa, hame, kolea, alani, kawau, naio, mamani, mamaki, olomea, olopuu, pilo, and the smaller trees such as naupaka and ohawai. Scattered throughout the forest under the taller trees there is an abundance of tree ferns, smaller ferns, ie-ie vines and other shrubs and vines.

This valuable forest during the past 50 years has been attacked on all sides and pushed back by various relentless factors and it would have been further reduced in size had not the Board of Agriculture and Forestry called a halt on these depredations and drawn a dead line beyond which these factors will positively not be allowed to pass. On the mauka side, from Piihonua to Manowaialee, the grazing of cattle on the higher slopes of Mauna Kea has depleted vast areas of fine forest and pushed the reserve boundary down until it now runs along the upper edge of the heavy, wet jungle. In two places on this side and in one place on the lower side of the reserve stockmen still graze cattle, to the utter ruination of the forest, on approximately 2,000 acres of land within the reserve boundary, which are privately owned. These lands are an integral part of the reserve and are quite necessary in the general scheme of forest protection, and unless the owners will voluntarily cease to use them for pasturage and will protect the remaining forest on them, it will be necessary for the government to step in and acquire title to them.

On the makai or lower boundary of the reserve the clearing of land for cane cultivation has pushed back the forest much further up the slopes than it originally existed and along this side jungle land was foolishly and unsuccessfully opened up for homesteading but had to be abandoned because of the mud and rain.

The net result has been that the reserve is now confined to a belt of forest country extending about 22 miles along the slope of the mountain. At the south or Hilo end this forest is 13 miles deep and there is an abundance of water flowing from the reserve to supply the needs in the country below. Toward the north end, however, the reserve narrows until it is only 5 miles deep and there is a corresponding diminution in the amount of water flowing from this portion. The lack of water begins to be felt on the plantation fields of the Laupahoehoe Sugar Company and a few weeks after the heavy rainfall ceases the flumes which carry the cane to the mill begin to run dry and it then becomes necessary at great expense to pump water up from sea level in order to flume the cane to the mill. Beyond this plantation on the Hamakua side there is only one field on the adjoining plantation from which the cane can be flumed with water and this only when there are heavy rains in the forest. Water is so scarce beyond this point that the cane must be taken off the fields by gravity with the use of overhead cables.

The importance of every bit of forest above the plantations in this part of the country for the conservation of water is keenly realized, and to help attain this end the Board contemplates add-

ing approximately 1,500 acres of mostly government land to the reserve system in this region.

During the summer of 1921, a start was made in the work of resurveying the old boundaries of the Hilo Forest Reserve, some of which had never been adequately marked on the ground and were unknown, and in ascertaining what additional lands along the lower boundary could be included in the reserve. The survey, which was necessarily very difficult, and which with many interruptions took four months of actual field work to complete, disclosed many remarkable situations. In some places it was found that the fence on a lease of government land outside of the reserve was 700 feet above the forest reserve boundary, and in many other places similar errors were discovered and the correct boundary located and marked for the first time.

Wherever it was possible to bring the lower line further down, unoccupied pieces of forest land belonging to the government and abandoned homesteads, off of which a living could never successfully be made, and lands which are preeminently suited to forest purposes, were added to the reserve.

In this manner a net area of 1,750 acres was lately added to the reserve, bringing the total area up to 111,750 acres or about 14 per cent of the total acreage of all reserves in the Territory. Of this area, as will be seen by reference to the accompanying map of the Hilo Forest Reserve, a portion of the lands are privately owned. Only approximately 56 per cent of the total area or 62,600 acres belong to the Territory and are under its control. The balance of 49,150 acres or 44 per cent belongs to different corporations or estates and, owing to the peculiar system of Hawaiian land surveys, these are indiscriminately interspersed among the government lands.

In the management of the reserve as a whole, therefore, it has been necessary for all parties who own lands in the reserve to get together and work along the same lines of forest protection. This has been accomplished through the organization of the Hawaiian Sugar Planters' Association, for most of the privately owned lands in the reserve are under the control of the sugar plantations by fee simple tenure or by leases. There has, therefore, been the closest cooperation between the Board of Agriculture and Forestry and the above association in all work connected with this reserve.

The resurvey of the lower line of the reserve enabled the forest officers to obtain accurate information as to the condition and lack of fences on the forest reserve boundary and as to the presence of cattle within the reserve and to take the necessary steps to rid the reserve of cattle and to make the boundary stock proof.

The summer of 1921 was devoted to the preliminary work of survey, and this last summer to the protection of the reserve boundary, removal of stock, and tree planting. The total boundary of the Hilo Reserve is 80 miles long. It was found that the

upper boundary, adjacent to three large cattle ranches, is well protected by a stock proof fence and that only a few head of cattle, and these very wild, are within the reserve in the mauka portion. Along the lower boundary, which is approximately 35 miles long, a great variety of conditions was found. Parts of the line are protected by impenetrable forests, parts by lava flows, and some sections are protected by impassable gulches and similar natural barriers. On still other sections the cane fields come right up to or very near the line and naturally there is no stock there to injure the forest. The most undesirable situations were where homesteaders or plantation tenants had cattle on their lots adjacent to the reserve and did not have any or adequate fences to confine their stock to their own premises. Long years of disregard of government property made it necessary to warn such persons, and to accomplish the desired end of forest protection a bargain was usually made with them for the immediate fencing of their land on the proper reserve boundary. This was accomplished by furnishing the wire and staples to the local men who cut and set the posts and stretched the wire.

In this manner fencing work was started last fall on fourteen different projects totalling a distance of 10 miles where the line across government land needed attention. Some of these were short stretches, only 650 feet in length, while others amounted to almost a mile and a half. Some of these fences are at the 2,000 feet elevation in the heavy rain belt where the boggy soil permits work to be done only for a few months in the year when the rainfall is the least heavy. In other sections the fences cross pahoe-hoe lava flows and the post holes have to be blasted with dynamite. Where government land ends and the boundary crosses private lands the plantations have followed the recommendations of the Board and have constructed fences where there is any danger of stock depredations. In this manner approximately 2.13 miles of fence have been constructed on the boundary of the reserve across private lands and in a few months when these projects are all completed the entire boundary will be absolutely protected from damage by stock.

The fencing work has been closely followed up by removal of stock from the reserve. A particularly bad situation existed at the southeast corner of the reserve where the important intakes of the Olaa and Hilō Sugar Company flumes are situated. Here, there were no fences and a cattle owner was wont to allow his cattle to wander at will around the flume heads and as far back into the forest as the Wailuku River on the government land of Piihonua. The forest officials urged the building of fences where the boundary crosses private lands and the owners readily complied. Where government land was involved the Board shared the expense and the fences are now almost completed. In the meantime official notice was served on the owner of the cattle to remove them at once or suffer the full penalty of the

law relating to the removal of cattle from reserves. The notice was sufficient to bring the desired results for the forest was promptly cleared of all cattle. These numbered in the region of sixty head and some that would not be driven had to be snared and the last six were so wild that the owner shot them and carried them out in gunny sacks.

By concentrating on the Hilo Forest Reserve the officials of the Division of Forestry of the Board have been able to convert this reserve from a "paper reserve" to a reserve protected to the greatest degree and functioning as a water producer for plantations which put out one-fifth of the total sugar crop of the Territory.

The fencing and cattle removal is being followed up by tree planting in the open places and several reforestation projects are now in progress.

DIVISION OF FORESTRY.

REPORT OF SUPERINTENDENT OF FORESTRY, SEPTEMBER, 1922.

November 8, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—I respectfully submit the following report of the Division of Forestry for the month of September, 1922:

FOREST PLANTING.

The following planting work, which resulted in the setting out of 6,565 trees, was accomplished during the month:

Oahu—

Lualualei Reserve, at the new Mikilua Arboretum: <i>Olneya Tesota</i> ..	10
Waianae-kai Reserve: Port Jackson fig.....	6

Hawaii—

Olaa Forest Reserve, 22 Miles: Japanese cedar.....	390
Kilauea Ranger Station: Australian red cedar.....	21
Hilo Forest Reserve—	
Laupahoehoe: 38 various species.....	2,500
Honomu: 5 various species.....	2,500
Piipihonua: Lemon gum on boundaries.....	273
Kaiwika: 3: Lemon gum on boundaries.....	350
Kahoahuna: Lemon gum on boundaries.....	150
Piha: Lemon gum on boundaries.....	300
Kaupakuea: Cook pine.....	65

6,565

In addition to this, 575 waiawi guava (*Psidium guayava pyrifera*) seedlings were supplied by the Honolulu nursery and were planted out in the private forest reserve at Makaha, Oahu, which has recently been enlarged by constructing the boundary fence further makai.

MIKILUA NURSERY.

On September 7, I located, staked out and mapped a suitable area in the Lualualei Forest Reserve near Mikilua for a dry land arboretum where trees may be planted, accurately registered, and watched to determine their ability to grow under existing conditions. New trees recently introduced by the H. S. P. A. and trees of our own will be tried out here. The first planting consisted of ten specimens of the tesota bean tree (*Olneya tesota*), recently introduced from Arizona.

CHAULMOOGRA PLANTATION.

An inspection of the tree plantations in the Waiahole Forest Reserve on September 4, showed that the chaulmoogra trees had pulled through the summer in a remarkably fine manner and had rather been benefitted by the dry weather. Hardly a single failure was noticed and the young trees are putting on vigorous new growth. The interplanted koa trees will soon give the chaulmoogra trees complete protection.

FOREST FENCING.

Hilo Forest Reserve. The following fencing project on the Hilo forest reserve boundary was completed during the month:

Piha Lots 1 to 4, in cooperation with Wm. Breithaupt, .77 mile.

Progress has been made on other projects as follows:

Waikaumalo, in cooperation with John Vieira, .51 mile of fence has been completed and all of the posts on the remainder of the line have been set for a distance of .89 mile.

Humuula, in cooperation with Kaiwiki Sugar Company. The posts along the whole length of the project (.27 mile) have all been set.

Honomu, Lot 17, in cooperation with V. Carrera. The posts along the whole length of the project (.14 mile) have been set.

Punahoa 2. Privately owned land. The posts have all been set on the total boundary of 1.75 miles with the exception of a distance of 400 feet.

The following two new fencing projects were started on the boundaries of this reserve during the month:

Laupahoeohoe homesteads Lots 23, 24, 25, in cooperation with Shojiro Yoshina, .18 mile.

Laupahoeohoe homesteads Lots 31, 34, 35, in cooperation with Vida Ishibashi, .32 mile.

Olaa Forest Reserve. The hog proof fence being built on the boundary of this reserve in the region of 24 Miles in cooperation with S. Kanamori, which is 1.13 miles long, has all been completed with the exception of the top wire for a distance of 800 feet. Work is still going on in connection with the fencing of the portion of the boundary of this same reserve near 22 Miles in cooperation with N. Holowaty, but progress is slow.

Repairs to existing fences on the boundaries of the Kealia and Molokaa Reserves on Kauai have been made by Ranger Lovell during the month and totalled 1,096 feet.

On September 19, I had a conference with the manager of the Kekaha Sugar Company, who promised that, as required by General Lease No. 1435 of the Waimea upper lands, he would begin at once the construction of the 1.21 miles of fence on the forest reserve boundary near Puukapele on the Waimea Canyon ridge.

REMOVAL OF CATTLE.

Toward the latter part of the month Ranger L. W. Bryan captured in trespass on the government land of Laupahoeohoe within the Hilo

Forest Reserve eleven head of cattle, which had broken through flimsy homestead fences and which belonged to the following owners:

Naomi Mahi, one cow found near Lot 23.

M. P. Silva, two cows found next to land in Lease No. 926.

John Kia, eight head of cattle found near Lot 23.

Under 9A of Sec. 2, Act 222, S. L. 1921, the owners were fined \$5.00 per head. The total amount of \$55.00 was thus paid in to the special forestry fund and it is planned to expend this sum in the hire of labor for planting trees on the same area where these cattle damaged the forest. Arrangements have also been made with the owners to construct stockproof fences on the boundary of the reserve in this region.

Under 9B of Sec. 2 of this same Act, notice was on September 4, served on Manuel and Joseph Silva to remove within ten days cattle belonging to them which had been seen in trespass on the Waianae-kai Forest Reserve, Oahu, having gained access through a gap in the stonewall. It was reported that all but two or three head of these cattle were removed within the time limit, after which the stonewall was repaired and made stockproof. A personal visit to the area revealed old cattle tracks and if these few cattle are still in the dense jungle of klu and cactus in the reserve they must be up toward Kumaipo where there is running water and where an attempt will be made to capture or shoot them.

FOREST FIRE.

September 1, 1922. Kilauea, Kauai. A fire was reported by Fire Warden L. D. Larsen to have started on this date through the carelessness of cowboys who had been burning pasture farther makai and had apparently not completely extinguished the burnings. About 20 acres of private lands covered with staghorn fern and a light stand of timber were burned over before the fire was extinguished the same day.

GRASS CUTTERS ARRESTED.

Through the inefficiency of a local ranger, grass cutting operations on Tantalus and Round Top became so frequent that a strenuous campaign was undertaken to put a stop to this trespass. After first giving frequent warnings, on September 13, my assistant arrested eight trespassers and had them booked at the police station. On the following day all of them, with the exception of one whose case was continued, plead guilty and were given suspended sentences. On the occasion of these arrests, the aforementioned ranger was found condoning the trespass rather than preventing it and this led me to suspend him at the end of the month, which action has subsequently been made permanent by you.

On September 26, my ranger-at-large arrested two more grass cutters on Tantalus and booked them for violation of Rule II. These plead guilty the following day in the police court and were given suspended sentences of 13 months. Since then, we have had very little trouble from trespassing grass cutters in this region.

ADDITIONS TO FOREST RESERVES.

In connection with the proposed enlargement of the Koolau Reserve on Maui by adding to the present reserve the land between the Hamakua and Lowrie ditches, a map showing details of land ownership was secured and passed over to the surveyor to assist him in the description of survey of this addition.

Two days were spent in running and marking a new boundary for the Honolulu Watershed Forest Reserve across the ridge between Nuuanu and Kalihi Valleys and across the latter valley. The new line,

which starts on the ridge about opposite the Oahu Country Club, is on the whole much further makai than the old line. Where it crosses the land of Kapalama it is 1.19 miles below the old line and includes 190 acres of this land. The owners have approved of the new line and are ready to fence it and to plant up the open areas so that the land will function to the best advantage as a true forest reserve. The new line takes in 260 acres of the land of Kamananui, which is at present under lease for grazing purposes with the result that cattle are making havoc of the water-producing forest in the hinterland. A suggestion to the owners in trust of this land that it be protected from damage mauka of the new reserve boundary line brought the answer that they must secure revenue from the land and that if the government wanted it they were willing to consider an exchange. Across Kalihi Valley the line on the south side has been moved about 892 feet mauka to follow a natural barrier and to exclude some pineapple land, but on the north side the line has been moved about 1000 feet makai so as to include about 50 acres of government land which formerly was not within the reserve.

The Land Commissioner has called to my attention the government land of Kia-Malama in Puna, Hawaii, which consists of about 2,000 acres of ohia forest. An application to lease this land for grazing was recently refused by the Land Board. As soon as the opportunity arrives, this land will be examined with a view to making it a forest reserve.

ADVICE ON LAND RECLAMATION.

Half a day was spent in company with a representative of the B. P. Bishop Estate in examining the land on the west slope of Koko Crater, which drains into the Kuapa fish pond and in giving advice connected with the reclamation of the land. In general, the further wash from the slope into the pond may be prevented to some extent by damming at frequent intervals the small gulleys which cut this land and by encouraging the growth of wild vegetation which may be effected by the removal of grazing animals from this particular area.

TEACHING FORESTRY.

At the direction of the President, my assistant and I began a course of instruction in forestry at the University of Hawaii on September 13, which will continue until January 15, 1923. On Mondays from 9 to 10, I give one lecture, and on Wednesdays at the same hour my assistant takes the class. Each of us alternately on Monday afternoons conducts a field period of three hours. There are 14 juniors and seniors of the sugar technology course receiving this instruction which embraces the history of forestry, forest protection, forest mapping, dendrology, forest planting, silvics and forest mensuration. Particular stress is being laid on the importance of protecting the native wet forests so that they will conserve water to the best advantage. Preparation for this teaching work necessitates our working at home in the evenings and on Sundays when we would ordinarily devote the time to recreation, but it is our hope that the course may develop some good material for our ranger force and that our extra efforts may thus be rewarded by the improvement in our forest service.

HILO RESERVE.

A lengthy news item on the work done this summer in whipping the Hilo Forest Reserve into shape, particularly by the construction of fences on the new makai boundary of the reserve was prepared at the direction of the President. This was published in the Honolulu Advertiser of September 10, well illustrated by photographs and a map of the reserve especially prepared by my assistant.

KAUAI TRIP.

Five days were spent on Kauai during the third week of the month on the following matters, which had awaited my attention:

A conference with the manager of the Kekaha Sugar Company resulted in the promise of the immediate construction of a required fence at Puukapele, already described in this report.

Investigation on the ground disclosed the fact that the Hawaiian Trail and Mountain Club had constructed their house on Lot 28, instead of on Lot 29, which is under permit to this club, at Kokee. The club was duly notified to move the house to the proper lot. The original error was made by the contractor to whom the location and building of the house was left.

The sanitary arrangements of several of the Kokee camps was investigated with a view to their improvement. The great need of a ranger to look after these matters on the ground continuously during the summer months is apparent and it is hoped that the next legislature will appropriate sufficient money for this purpose.

A trip was made on the hydrographers' trail as far as the ridge between the Koaie and Waialae Valleys to investigate the presence of wild cattle which are damaging the forest in this swampy region. Although comparatively fresh tracks were noted, no cattle were seen, but several wild pigs were killed.

The last day on the island was spent in investigating the forest reserve boundary back of the Kilauea plantation. The original line has become unsatisfactory in that it jumps from hill to hill on long courses leaving out wet forest land that should be protected and including good agricultural and open grazing land. Most of the land involved is privately owned and a preliminary location of a new line to correct these errors was satisfactorily made with the manager.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

**REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY,
SEPTEMBER, 1922.**

October 19, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir:—I respectfully submit the following statement of my activities during September, 1922:

The entire month was spent on the island of Oahu upon a variety of projects both in the field and in the office.

HILO FOREST RESERVE.

In order to illustrate a newspaper article by the Superintendent, an outline map of the Hilo Forest Reserve was prepared on the scale of 5000 feet to the inch. This map, which was traced from the new reduction of Mr. Hockley's survey, had for its main purpose the graphic portrayal of conditions along the boundary of the Hilo Reserve so that "he who runs may read." Appropriate symbols were used to show that more than two-thirds of the entire boundary is exposed to the onslaught of cattle, and requires the constant maintenance of stockproof fences.

The article by Mr. Judd and the map were published in the Honolulu Advertiser on September 10.

Compilation of data for the boundary working plan of the Hilo Forest Reserve was completed during the month and will require to be checked before it is put in final form.

MIKILUA ARBORETUM.

On September 7, the Superintendent and myself, accompanied by the horticulturist, Mr. Griffin, selected a site at the mouth of Mikilua Valley in the Lualualei Forest Reserve for the establishment of a xerophytic arboretum. Experimental plantings will be made of drought-resistant trees from all parts of the world for the purpose of discovering species which can be used in the afforestation of thousands of acres of dry and barren leeward slopes within the forest reserves. This is the first dry-land arboretum in the Hawaiian Islands and should be productive of valuable results.

KALIHI WATERSHED.

Two days were spent with the Superintendent and a member of the Survey Department in determining and flagging a new makai boundary across the several ridges and valleys which constitute the Kalihi watershed. This is a necessary preliminary of our plan to place this valuable water-producing area under strict protection as a forest reserve. Following the survey, fences will have to be built to exclude the cattle which have ranged at will in the region for many years and have decimated the native forest over the entire area. When the fences are completed reforestation on an extensive scale should be undertaken at once in order to restore the water conserving power of the region as rapidly as possible.

TRESPASS ON TANTALUS.

Vigorous action was made necessary during the month by continued violations of Rule II, the offenders being Spanish and Portuguese dairy-men who have been in the habit of cutting grass from the forest reserve areas along the Round Top-Tantalus Drive. On September 9, I brought down Manuel Ruis and party of helpers with a Denby truck belonging to a Waikiki dairy. This being their first offense, they were released with a reprimand after giving up the grass cut in trespass. On September 13, I found 16 men and boys of the Kapahulu district with eight wagons along the Drive. The grass which they had cut was confiscated, and on the following morning, 7 men, seniors of the party, were given a suspended sentence of thirteen months. They were: Joe Salado, Antonio Himenes, John Cardina, Antonio Boneza, Julian Sanchez, David Teixeira, and Frank Marino. An eighth, N. Santiago of Monte's Dairy, having retained counsel, had his case continued. On September 26, Ranger Ellis arrested two Japanese workmen of T. F. Farm, proprietor of the Aloha Dairy. These men, Ishigawa and Matsuichi, were booked at the police station and on the following morning were given a suspended sentence of thirteen months.

CO-OPERATION AT THE UNIVERSITY.

In pursuance of the agreement between the Division of Forestry and the President of the University of Hawaii, the condensed course in general forestry was begun at the University on September 13, with a class of fourteen men. Two lectures on Forest Planting and two field trips with the class constituted my part of this work for the opening month. The initiation of this course, which contemplates covering the

whole field of forestry in one semester, has already shown that it will require considerable time for preparation. Owing to the peculiar status and type of forests in Hawaii, all existing material in the form of text-books and treatises must be abridged and specifically adapted in order to make its presentation understandable to island-bred students. However, it is felt that the investment of time for this task, although it can ill be spared from our regular duties at this particular time, will be more than repaid by the better appreciation of the immense value of forestry to the leading island industries which it is expected to develop in the students taking the course.

MISCELLANEOUS.

During the month Mr. Lowdermilk and wife, en route to the Orient, stopped for two days in Honolulu. Lowdermilk, who was a brother officer with me in the Forest Engineers in France, and latterly with the U. S. Forest Service in Montana, has contracted to spend five years in experimental forest work in the vicinity of Nanking, China. He was anxious to secure information on Hawaiian forestry and was accordingly supplied with copies of our publications on the subject.

On September 23, information was requested by Department Headquarters of the Army relative to the use of the island of Moku Manu as a target in airplane bombing practice. Copies of Rule IV, defining Moku Manu as one of the bird-refuge islands, were sent in reply. It is hoped that some other small island of less value can be agreed upon for this purpose.

A brief article under the title of "Forestry in the Hawaiian Islands" was prepared for the special Los Angeles edition of the Honolulu Advertiser published on September 20.

An alphabetical compilation was prepared of registered stock brands belonging to owners on Hawaii who run cattle or horses on lands touching the more important forest reserves.

The work of mounting and legending in albums the collection of official photographs was resumed during the month.

Respectfully submitted,

C. J. KRAEBEL,

Assistant Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, SEPTEMBER, 1922.

October 10, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir:—I herewith submit a report of the work done during the month of September.

NURSERY—DISTRIBUTION OF PLANTS.

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Oahu—Sold . . . . .	.....	....	577	577
Gratis	1000	600	1801	3401
				<hr/> 3978

SUB NURSERIES.

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Maui and Molokai.....		1550	....	1550
Kauai . . . . .		....	550	550
Hawaii	2000	5310	77	7387
				<u>9487</u>
Total for all islands.....				13,465

COLLECTIONS—GOVERNMENT REALIZATIONS.

Sale of plants, Government Nursery.....	\$ 9.20
Sale of plants, Hilo Nursery.....	2.20
Rent of Office Nursery Grounds for May.....	35.00
Total	<u>\$46.40</u>

FOREST RESERVES—TREES PLANTED.

Makaha Private Reserve, Waiawi.....	575
Hilo Reserve: Araucaria Cookii.....	<u>65</u>
Total	640

PLANTATION COMPANIES, ETC.

Under this heading 1000 seedlings were distributed.

PRESERVATION OF FOREST RESERVES.

For Quarter Ending September 30, 1922.

Rents—

Rent of small piece of land in Pauoa Valley, April 1, 1921, to April 1, 1922.....	\$ 3.00
Parker Ranch, rent of 73 acres of land in Hilo Forest Reserve near Keanakolu, August 12, 1922, to August 12, 1923.....	39.50
Kokee Camps—Camp site No. 38B 1922.....	3.70
Black Sand—	
193 loads black sand taken from Makiki Valley sand pit at 50 cents per load.....	<u>96.50</u>
Total	\$142.70

ANIMAL INDUSTRY REVOLVING FUND.

James Spalding, Rabies vaccine.....	\$ 3.50
T. Heremoto, Rabies vaccine.....	19.75
K. Sacaki, Rabies vaccine.....	8.00
Lillis & Colburn, Rabies vaccine.....	3.00
H. M. Santos, Rabies vaccine.....	1.50
Robert Hind, Serum.....	25.75
Haleakala Ranch, Hemorrhagic septicemia.....	27.50
Haleakala Ranch, Anthrax vaccine.....	<u>272.25</u>
Total	\$361.25

MAKIKI STATION.

The work done at this station consisted of the regular routine, namely, transplanting, mixing and sterilizing soil, making boxes and potting plants.

HONOLULU WATERSHED.

The work done on the watershed consisted of clearing trails, hoeing trees and clearing off for planting.

ADVICE AND ASSISTANCE.

The writer has been asked by the President of the Maui County Fair to attend, during the coming fair on October 12th to 16th, for the purpose of assisting in the judging of the plants, flowers and fruit.

The following number of visits have been made, also advice given to people requesting same:

Calls made	8
Advice given people calling.....	9
Advice given people by phone.....	6

Respectfully submitted,
DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY.

REPORT OF ENTOMOLOGIST, SEPTEMBER, 1922.

October 16, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—During the month of September the insectary handled 3,700 pupae of the melon fly, from which there were bred 782 females and 512 males of *Opius fletcheri*.

The distribution of the parasites was as follows:

MELON FLY PARASITES.

Opius fletcheri.

	Females	Males
Oahu: Moanalua Cucumber Field, Honolulu.....	560	550

FRUIT FLY PARASITES.

Diachasma Tryoni.

Oahu: Mrs. Grossman, Nuuanu Avenue, Honolulu.....	50	50
Mr. M. Kawahara, Kalihi, Honolulu.....	100	100

Diachasma Fullawayi.

Oahu: Mrs. Grossman, Nuuanu Avenue, Honolulu.....	25	25
Mr. M. Kawahara, Kalihi, Honolulu.....	50	50

Dirhinus Giffardii.

	Males and Females
Oahu: Mr. M. Kawahara, Kalihi, Honolulu.....	100

Galesus Silvestrii.

Oahu: Mr. M. Kawahara, Kalihi, Honolulu.....	200
--	-----

Tetrastichus Giffardianus.

Oahu: Mrs. Grossman, Nuuanu Avenue, Honolulu.....	500
Mr. M. Kawahara, Kalihi, Honolulu.....	600

The Entomologist's time was taken up with attending to the insects held in quarantine. During the month two queen bees were introduced by Mr. St. John Gilbert, and after going through the quarantine, were handed over to him.

Two shipments of insects were received from Mr. Osborn, one on the 5th inst., and the other on the 12th. The first contained 42 coccinellid larvae (*Nephus* species) and about 50 tumble bugs. The second shipment contained encyrtids associated with *P. bromeliae* and supposed to be parasitic on that species. All of these insects have been received before and were given the usual handling.

Respectfully submitted,
D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION.

REPORT OF CHIEF PLANT INSPECTOR, SEPTEMBER, 1922.

September 30, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of September, 1922, as follows:

During the month we boarded 52 vessels, 27 of which carried vegetable matter. Eight of these vessels passed through the Canal Zone. The following disposal was made of the various shipments:

	Lots	Packages
Passed as free from pests.....	2307	33,587
Fumigated	1	1
Burned	53	53
Returned as contraband.....	2	2
Total inspected	2363	33,643

Of these shipments 33,240 packages arrived as freight, 300 as baggage and 103 as mail.

RICE AND BEAN SHIPMENTS.

Thirteen thousand thirty-four bags of rice and 351 bags of beans arrived from mainland ports and 533 bags of rice and 2071 bags of beans from Japan and were found free from pests.

PESTS INTERCEPTED.

Approximately 3621 pieces of baggage belonging to immigrants from foreign countries were examined, from which 24 lots of fruit and 25 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned material follows:

From Funchal: 1 package of seeds and dried fruit infested with rice weevil and *Lepidopterous* larvae.

PROHIBITED MATERIAL BURNED.

- 1 package of paddy rice in baggage from Manila.
- 2 lots of Central American bananas in baggage.
- 1 lot of apples from Australia in baggage.
- 3 lots of lemons from Australia in baggage.
- 1 lot of oranges from Australia in baggage.

MATERIAL FUMIGATED.

- 1 package of seeds and dried fruit from Funchal.
- 1 basket dried chestnuts from China in cargo, *Lepidopterous* larvae.
- 1 box rose plants from California by express, ants (*Pheidole* sp.) and the Argentine ant (*Irydomyrmex humilis*).

BENEFICIAL INSECTS.

September 5th, per S. S. Wilhelmina, 1 package of beneficial insects from Mr. Osborn, Mexico, (Dung beetles).

September 12th, per S. S. Matsonia, 1 package mealybug parasites from Mr. Osborn, Mexico, (*For Pseudococcus bromeliae*).

QUEEN BEES.

By S. S. President Taft, September 17th, two queen bees arrived by mail which were turned over to Mr. D. T. Fullaway for observation and quarantine.

HILO INSPECTION.

Brother M. Newell, Inspector at Hilo, reports the arrival of 8 vessels, 7 of which carried vegetable matter consisting of 325 lots and 5550 packages, all arriving free from pests. Eight thousand seven hundred three bags of rice and 254 bags of beans were in cargoes from the mainland and were free from infestation.

KAHULUI INSPECTION.

Mr. L. Gillin, Maui Inspector, reports 9 vessels arriving at the port of Kahului, 4 of which carried vegetable matter consisting of 20 lots and 961 packages, all passed as free from pests. In the cargoes were 3620 bags of rice and 15 bags of beans from Coast ports and were free from infestation.

INTER ISLAND INSPECTION.

51 steamers were attended to plying between islands.

Passed as free from pests:

Taro (bags)	459
Vegetables (packages)	67
Fruit (packages)	272
Plants (packages)	93
Seeds (packages)	21
Pineapple shoots (bags).....	2339
Sugar cane (cases).....	13

Total3264

Rejected: Plants6 packages

LOCAL FUMIGATION.

During the month we fumigated the following for various people:

- 1415 bags of grain.
- 5 lots of furniture.
- 1 lot of books.

Respectfully submitted,
E. M. EHRHORN,
Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY.

REPORT OF TERRITORIAL VETERINARIAN, SEPTEMBER, 1922.

October 12, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—I have the honor to submit the following report on the work of this Division for the month of September:

TUBERCULOSIS CONTROL.

For a detailed report on this work, you are referred to the appended report of my assistant. The testing was confined principally to inter-island shipments of cattle and importations from the Coast.

INFECTIONS AND CONTAGIOUS DISEASES.

No reports of outbreaks of infectious and contagious diseases among live stock, occurring in any part of the Territory, have reached this office.

The major part of the past month was taken up with the inspection of piggeries in different parts of this island. A comprehensive inspection of such places is being made and so far 126 such places have been visited and a total of 7480 head of hogs examined. Notes were taken on the health of the animals and general sanitary condition of the premises. This survey, which has been carried out far enough for the present, will be made the subject of a special report in which methods of control will be discussed in full and an outline of policy in regard to the control of outbreaks of disease among swine will be submitted. Suffice it for the present to say, that not one sick pig was seen in the districts covered, every one of the 7480 head being in Al condition and this, under conditions of filth and lack of sanitation, which surprised even me, familiar as I am with general conditions throughout the island. To introduce hog cholera virus among these hogs with the idea of protecting them against some hypothetical infection, would be the height of folly.

WATER-FRONT INSPECTION AND LIVE STOCK IMPORTATIONS.

The live stock inspector has reported the boarding and inspection of 89 vessels during the month, the following of which carried live stock to this Territory:

S. S. Lurline, San Francisco—

2 Angus bulls, Alexander & Baldwin.

7 Angus bulls, 3 Angus heifers, Kekaha Sugar Co.

8 Crates poultry, F. L. Waldron.

S. S. Wilhelmina—

2 Dogs, F. J. Bailey.

1 Box white rats, University of Hawaii.

127 Crates poultry, Various.

S. S. President Lincoln, Hong Kong—

1 Dog, M. H. Sanders.

S. S. Matsonia, San Francisco—

1 Crate poultry, American Railway Express Co.

S. S. Hyades, San Francisco—

22 Horses, W. C. McDevitt.

1 Horse, W. F. Dillingham.

- 28 Cattle, Heath & Whitacre.
 4 Berkshire hogs, Kamehameha School.
 8 Chesterwhite hogs, A. M. Brown.

S. S. Makena, Seattle—

- 41 Crates poultry, Various.

S. S. Manoa, San Francisco—

- 1 Dog, J. F. Colburn.
 1 Dog, Major Mathews.
 1 Dog, Lillis & Kelly.

- 92 Crates poultry, Various.

S. S. Manulani, San Francisco—

- 2 Holstein bulls, Waialae Ranch.
 8 Crates poultry, Chang Bro's.

S. S. Ventura, San Francisco—

- 28 Crates poultry, C. H. Bellina.

On the S. S. Hyades, which arrived September 13, there was a shipment of 22 horses consigned to W. C. McDevitt, which had to be quarantined for the reason that more than half of them were suffering from a virulent form of equine influenza. Some were developing pneumonia and a large number had considerable discharge from the nose.

These animals had to be driven along the waterfront to the quarantine station, thereby exposing stock here to a virulent infection. This again demonstrates the unsuitableness of the present location of this station.

OUTLYING ISLANDS.

As no outbreaks of disease among stock have been reported to this office during the month by the Deputy Territorial Veterinarians, it is considered unnecessary to delay this report longer.

Respectfully submitted,

L. N. CASE,
 Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN, SEPTEMBER, 1922.

October 12, 1922.

Dr. Leonard N. Case,

Territorial Veterinarian, Board of Agriculture and Forestry,
 Honolulu, T. H.

Dear Sir:—I herewith submit a report of the work done during the month of September, 1922:

TUBERCULOSIS CONTROL.

The following cattle were tuberculin tested:

	Cows	Bulls	Heifers
Alexander & Baldwin.....	..	2	..
American Factors .....	..	3	7
Heath & Whitacre.....	28	..	..
E. A. Jordan.....	2	..	..
C. H. Bellina.....	..	2	4
A. M. Brown.....	2	..	..
M. Solado	3	..	..
Waialae Ranch .....	..	2	..
Geo. R. Carter.....	3	..	..
Manuel Gomes	2	..	..
No reactions were observed.			

RABIES TREATMENT.

The following dogs were given the anti-rabies one injection treatment:

M. H. Sanders.....	1 Chow dog.
J. F. Colburn.....	1 Irish setter pup.
W. J. Lillis.....	1 English-bull bitch.
Major Mathews	1 Airedale.

INSPECTIONS.

During this month all the hog premises in the Manoa, Moiliili, Kapahulu, and Waikiki districts were carefully inspected, with regard to the sanitary condition of the houses, pens and surrounding premises, and the construction of the housing and health of the animals. Instructions about cleaning up were given in instances where it was deemed necessary.

Respectfully submitted,

L. E. CASE,

Asst. Territorial Veterinarian.





THE HAWAIIAN FORESTER AND AGRICULTURIST

DECEMBER, 1922

CONTENTS

	Page
Editorial	267
Recent Appointments	268
The Lanzon (Higgins).....	269
Division of Forestry.....	270
" " Entomology	282
" " Plant Inspection	284
" " Animal Industry	287
By Authority—Forest Reserve Hearing.....	291

VOL. XIX

PRICE, TEN CENTS

No. 11

ARNOLD ARBORETUM
JAMAICA PLAIN,
MASS.



The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture

Issued under the direction of the Board of
Commissioners of Agriculture and
Forestry, Territory of Hawaii.



Address all communications to
C. S. JUDD, Editor "THE FORESTER"
P. O. Box 3319, Honolulu, T. H.

For business relating to subscriptions
or advertising, address

ADVERTISER PUBLISHING CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c per copy ; \$1.00 a year ; Foreign, \$1.25.

Entered as second-class matter at the Post Office at Honolulu,
Hawaii.

Officers and Staff of the Board of Commissioners of Agriculture and Forestry

(1923)

COMMISSIONERS

A. L. C. Atkinson, *President.*

Walter M. Giffard

H. M. von Holt

Arthur H. Rice

T. E. Wall

C. S. Judd, *Executive Officer.*

DIVISION OF FORESTRY

C. S. Judd, *Superintendent of Forestry and Chief Fire Warden.*

C. J. Kraebel, *Assistant Superintendent of Forestry.*

David Haughs, *Forest Nurseryman.*

H. K. Lovell, *Forest Ranger for Windward Kauai.*

V. L. Ellis, *Forest Ranger at Large.*

Alfred Rocha, *Forest Ranger for Windward Oahu.*

A. J. W. Mackenzie, *Forest Ranger for Olaa, Hawaii.*

C. E. Stone, *Forest Ranger for Kau and South Kona, Hawaii.*

A. P. Aguiar, *Forest Ranger for the Panaewa Reserve, Hawaii.*

L. W. Bryan, *Forest Ranger for the Hilo and Kohala Reserves.*

Joe Rita, Jr., *in charge Kalaheo Nursery, Kauai.*

James Lindsay, *in charge Haiku Nursery, Maui.*

Bro. M. Newell, *in charge Hilo Nursery, Hawaii.*

DIVISION OF ENTOMOLOGY

D. T. Fullaway, *Entomologist.*

Quan Chew Chock, *Laboratory Assistant.*

Rodrigo Villafior, *Insectary Assistant.*

DIVISION OF PLANT INSPECTION

E. M. Ehrhorn, *Chief Plant Inspector.*

L. A. Whitney, *Assistant Plant Inspector.*

E. L. Caum, *Assistant Plant Inspector.*

J. K. Joshua, *Dock Inspector.*

A. M. Mito, *Dock Inspector.*

T. F. Chong, *Clerk and Assistant.*

Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Louis Gillin, *Fruit and Plant Inspector, Kahului, Maui.*

E. E. Madden, *Honorary Plant Inspector, Mahukona, Hawaii.*

Geo. B. Leavitt, *Honorary Plant Inspector, Eleele, Kauai.*

G. C. Munro, *Honorary Plant Inspector, Manele, Lanai.*

DIVISION OF ANIMAL INDUSTRY

Leonard N. Case, *Superintendent and Territorial Veterinarian.*

Lloyd E. Case, *Assistant Territorial Veterinarian.*

Joseph Richard, *Livestock Inspector.*

H. B. Elliot, *Deputy Territorial Veterinarian, East Hawaii.*

A. R. Rowat, *Deputy Territorial Veterinarian, West Hawaii.*

J. C. Fitzgerald, *Deputy Territorial Veterinarian, Maui.*

Cyril Golding, *Deputy Territorial Veterinarian, Kauai.*

CLERICAL STAFF OF BOARD

Miss M. T. Kelly, *Clerk.*

Miss K. O'Dowda, *Librarian and Stenographer.*

Miss H. Martin, *Stenographer.*

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIX. HONOLULU, DECEMBER, 1922.

No. 12

The routine reports of the Superintendents for October and November, 1922, are printed in this issue of THE FORESTER.

The fencing of the makai boundary of the Hilo Forest Reserve continues at a satisfactory rate.

Internal parasites of the pineapple mealy bug and of the guava mealy bug were received from the Assistant Entomologist in Mexico during October.

For planting on Arbor Day, which was celebrated this year on November 17, 1922, 12,534 trees were distributed from the four tree nurseries of the Board.

All of the veterinarians of the Board met with the Commissioners on December 5 and 6, 1922, in Honolulu and discussed important topics in connection with diseases of swine and cattle.

The thinning out of some of the trees along the road to the Pali in Nuuanu Valley has opened up delightful vistas of nearby waterfalls and distant mountainsides.

Kauri pine trees at Waiahole, Oahu, have grown seven feet in two and a half years where they were cultivated, but the trees merely planted in holes in the brush have grown only one foot in height in the same time.

Volume measurements made by the students taking the forestry course at the University of Hawaii show that the swamp mahogany (*Eucalyptus robusta*) forest on Tantalus which is 34 years old produces 129.2 cords of wood per acre.

The Territorial Veterinarian is of the opinion that roup as well as contagious epithelioma or sorehead in poultry is amenable to treatment by vaccination and that the two conditions are caused by essentially the same bacterial flora.

On account for the need for economy the Division of Forestry was represented at the Maui County Fair held in Kahului on October 12 to 14, 1922, by only a small exhibit of trees from the Haiku Nursery, but this was awarded a special prize.

Attention is called to the article by Mr. J. E. Higgins, Professor of Agronomy and Head of the Department in the College of Agriculture at Los Banos, on the lanzon fruit of the Philip-pines which would bear further encouragement in Hawaii.

At the request of Col. C. R. Forbes, Director of the U. S. Veterans Bureau, and with whom many of us are acquainted, the attention of the World War Veterans is called to the fact that no matter how long a time has passed since the last premium payments on their insurance, they still have the right to renew this valuable contract providing they are in good health or suffering from a disability, due to service, that is not total and permanent. This right will expire on March 3, 1926.

RECENT APPOINTMENTS

The following recent appointments have been made:

November 23, 1922, James A. Gibb, Fire Warden in and for the District of Wailuku, Island of Maui, to replace C. E. S. Burns, moved away.

December 1, 1922, Alfred Rocha, Forest Ranger in and for the Districts of Koolaupoko and Koolauloa, Island of Oahu.

December 1, 1922, Edward L. Caum, Assistant Plant Inspector and Pathologist in the Division of Plant Inspection.

December 15, 1922, Thomas E. Wall appointed by the Governor as a Commissioner of the Board to take the place of J. M. Dowsett, resigned.

December 28, 1922, C. E. S. Burns, Fire Warden in and for the District of Lahaina, Island of Maui, to replace A. W. Collins, deceased.

December 28, 1922, George Gibb, Fire Warden in and for the District of Hana, Island of Maui, to replace W. K. Schultze, moved away.

THE LANZON

By J. E. HIGGINS.

The lanzon (*Lansium domesticum* Jack) is the most conspicuous and one of the most important fruits in the markets in the Philippines during September. The fruits grow in dense clusters resembling in the distance the fruits of Loquat, but upon closer examination they are seen to be much smoother and the clusters more dense and larger. The individual fruits range from an inch to an inch and three-quarters in length and from seven-eighth of an inch to an inch and a half in diameter and are attached rather firmly to the cluster. Each fruit is nicely covered with a thin, tough leathery rind or skin which encloses five segments of deliciously flavored pulp, which in taste reminds one of the grape-fruit. The fruit usually contains from one to two seeds, but frequently it is seedless and it is probable that in time varieties may be found which will be quite seedless and these may be propagated by budding or grafting. There is a bitter principle in the seed and in eating the fruit, one is careful not to eat too close to the seed. The customary manner of eating the fruit is to squeeze it between the thumb and finger until the leathery skin cracks, exposing to view the five delicious morsels within, which are easily separated from the skin and from a thin inner integument which encloses each segment.

The lanzon tree is of very upright growth and carries its fruit clusters close to the trunk or main branches of the tree. It is customary in gathering the fruit, for the picker to climb the tree and place a rope around the ascending branches drawing them in toward the center so that nearly all the clusters may be reached from the center of the tree. These clusters are carefully cut, placed in baskets and lowered by a rope to the ground. The fruits are packed in large bamboo baskets and are shipped to all the country markets as well as to Manila.

An interesting requirement of this tree is its apparent love of shade and it is, therefore, planted in coconut plantations as extra trees in addition to the regular number of coconuts. When planted without shade the lanzon tree appears to be subject to diseases and insect attacks and does not thrive well.

The tree is propagated by seeds and up to the present time no method of a sexual propagation has come into use among the growers. Marcottage, air layering or Chinese layering is known and is commonly practiced among the Filipino fruit growers, but this method for some reason has not been used to any considerable extent with the lanzon.

It is unfortunate that the tree requires many years to come into bearing, being almost a rival of the Litchi in this respect, as many growers claim that seedlings can hardly be expected to

The planting on the Waimanalo Reserve is being done voluntarily by the Waimanalo Sugar Company on exposed situations where trees other than the ironwood would not survive. The swamp mahogany trees were planted for a windbreak on Round Top by students who are taking instruction in forestry. The Jamaica yokewood planted in the Waiahole Reserve is a new introduction made by Dr. H. L. Lyon from Jamaica. The tree is a rapid grower and early seeder and promises to be most valuable as a fence post producer.

KAURI PINE

During an inspection of the Waiahole Forest Reserve a few measurements were taken of the kauri pine trees (*Agathis robusta*) planted less than three years ago. In one lot of 490 trees, planted 10 by 10 feet apart in January, 1920, and cultivated periodically by harrowing, the trees are doing remarkably well, the tallest being 7 feet 2 inches in height. In a planting of 70 trees made in April of the same year, by simply making a clearing in the brush and planting the trees in holes, without cultivation except hoeing, growth has been much slower and the tallest tree is only one foot high. This species of kauri pine is probably the most valuable tree that can be planted for timber producing purposes in these islands and it is unfortunate that seed in large quantities is not frequently available.

During this same trip the barking of kukui trees near the Waiahole tunnel portal by fishermen was investigated and the steps that have been taken to prevent further trespass have already been made known to you in a special report.

TESOTA BEAN TREE

The seedlings of the tesota bean tree (*Oleaya tesota*) which were raised from seed recently introduced and which were advertised for distribution in the local papers and in "The Extension Letter" have all been distributed and the supply is exhausted. The demands for this new tree are so many that an effort has been made to secure an additional supply of seed.

FOREST FENCING

Progress made during the month in the work of making stockproof forest boundaries amounted to a total of 4.44 miles, distributed as follows:

New Fences Completed:

	Miles
Olaa Forest Reserve, Hawaii, at 24 Miles in Cooperation with S. Kanamori, Lots 385-387.....	1.13
Hilo Forest Reserve, Hawaii—	
Kaiwiki 2, Lot 66 by Jacinth Faries.....	.14
Kaiwiki 2, Lot 68 by Manuel d'Alameda.....	.20
Honomu, Lot 17 in cooperation with Victorino Carrera.....	.14

Progress Made With New Fences:

Hilo Forest Reserve, Hawaii—	
Waikaumalo, Lots 56 A and B, in cooperation with John Vieira .....	.40
Humuula, in cooperation with Kaiwiki Sugar Company.....	.25

Fences Repaired:

Kealia and Moloaa Reserves, Kauai.....	.21
Olaa Forest Park Reserve, Sec. C.....	.11
Olaa Forest Park Reserve, Sec. A.....	1.86

Total fencing accomplished.....4.44

MAUI COUNTY FAIR

On account of the need for economy, the Board did not make any extensive exhibit at the county fair held at Kahului, Maui, on October 12 to 14, but was represented only by a collection of trees from the Haiku Nursery, which was awarded a special prize. Mr. Haughs was the only official to attend the fair and went up in the capacity of judge of the flower and plant exhibits.

GRASS CUTTING

Several more new grass cutters were arrested during the month and were booked at the police station so that now almost all are thoroughly acquainted with the rule and this trespass is about terminated.

IMPROVEMENTS ON ROUND TOP

Preparations for the establishment of the macadamia nut plantation on Round Top were begun during the month by the Hawaiian Macadamia Nut Company which holds an agreement for planting of 20 acres with this valuable tree.

Efforts were begun for making certain improvements in this region. These consisted of determining the ownership of the abandoned steam roller near the gravel quarry with the plans to have it removed and of having the prison camp tidied up and made more sightly. A new trail on the side of Makiki Valley was also located on a convenient grade and staked out to replace the old trail which now runs through the middle of the macadamia nut plantation.

FORESTRY LECTURES

Lectures on forestry at the University of Hawaii have been given once a week by my assistant and myself and preparation for them has taken considerable of our time at home. For field work on Monday afternoons the students have begun a much needed topographic map of Round Top, have done actual seed collection and sowing and transplanting and outplanting of trees, and have studied in the field the distinguishing characteristics of both native and introduced trees.

On October 19, I lectured for an hour on the necessity for forest protection before the men enrolled in the Short Course for Plantation Men at the University of Hawaii.

EXTENSION OF HONOLULU WATERSHED RESERVE

Having completed the extended boundaries of this reserve across the Nuuanu-Kalihi ridge and the latter valley, one day was spent in a field examination for extending the line across the land of Waialae on the east side of the city. Here the boundary will be brought right down to the upper limits of pineapple cultivation.

PROPOSED HONOULIULI RESERVE

Plans were made for making a re-examination of the proposed forest reserve on the land of Honouliuli, Oahu, recommended some years ago by my predecessor, but never actually set apart. This field work has been undertaken by my assistant.

DR. SKOTTSBERG

Arrangements were made for several field trips by Dr. C. Skottsberg into forest regions of particular botanical interest, the main trip being to the interior section of Kauai. The Territory will benefit greatly by the botanical material which Dr. Skottsberg has collected and will classify and deposit in our local museum.

Respectfully submitted,
C. S. JUDD,
Superintendent of Forestry.

REPORT OF SUPERINTENDENT OF FORESTRY, NOVEMBER, 1922.

Honolulu, Hawaii, December 21, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—I respectfully submit the following report of the Division of Forestry for the month of November, 1922:

FOREST PLANTING

During the month the planting operations on eight different forest reserves resulted in the setting out of 5,539 trees in the following places:

Kauai:

Moloaa Forest Reserve—Lemon gum..... 125

Oahu:

Ewa Forest Reserve at Aiea—Swamp mahogany..... 624
Waimanalo Forest Reserve—Ironwood.....1,000
Round Top Forest Reserve—Macadamia nut trees.....1,000
Round Top Forest Reserve—Swamp mahogany..... 76
Lualualei Forest Reserve at Mikilua Arboretum—38 miscellaneous species 169

Hawaii:

Kilauea Ranger Station—Australian red cedar..... 130
Kilauea Ranger Station—Osage orange..... 6
Olaa Forest Reserve—Japanese cedar..... 409
Hilo Forest Reserve at Honomu—*Ficus rubiginosa*..... 900
Hilo Forest Reserve at Honomu—*Ficus eugenioides*..... 500
Hilo Forest Reserve at Laupahoehoe—*Ficus rubiginosa*..... 600

Total number of trees planted.....5,539

The swamp mahogany plantings were for windbreaks, the lemon gum for forest reserve boundary markers, and the macadamia nut trees were the first to be planted out on Round Top under the agreement with the Hawaiian Macadamia Nut Company. The planting in the Mikilua Arboretum consisted of from 3 to 5 specimens of 38 miscellaneous species of trees which are being tested out for growth under the dry conditions which exist there.

ARBOR DAY

For planting on Arbor Day, which was celebrated this year on November 17, the total distribution of trees was 12,534 trees. These were sent out from our four main tree nurseries as follows:

Kauai nursery at Kalaheo.....	1,677
Oahu nursery at Honolulu.....	7,140
Maui nursery at Haiku.....	1,800
Hawaii nursery at Hilo.....	1,917
Total number of trees distributed.....	12,534

On November 15, I gave a talk on the origin and purpose of Arbor Day at Punahou Academy and on Arbor Day assisted in the labelling of trees on the campus and telling something about them.

OLONA FIBER

The demand for a local fiber to replace the introduced and rather expensive raffia in binding objects of handicraft taught in the public schools, has turned attention to the possibilities of using our indigenous olona (*Touchardia latifolia*) for this purpose and producing it in quantity by cultivation. As this is somewhat apart from our regular work, I have advised a separate appropriation of about \$1,500 to experiment in the raising of the plants, as the old Hawaiians did.

FOREST FENCING

Progress was made in several fencing projects during the month, but the heavy rains in the early part of November seriously interfered with fence building on the makai line of the Hilo Forest Reserve, where about three miles of boundary remain to be fenced.

On the boundary of the Kau reserve on Hawaii .87 mile of new fence was completed by the adjacent plantation where the reserve line crosses the land of Kaunamano.

The new fence required by government lease on the makai boundary of the Puukapele reserve on Kauai was begun on November 6.

On the Olaa reserve boundary on Hawaii back of 22 Miles, N. Holo-waty completed 600 feet of fence adjacent to his homesteads.

Repairs were made in existing fences to the extent of .12 mile on the Olaa Forest Park Reserve Sec. C, on Hawaii, and .43 mile on the Kealia and Moloaa Reserves on Kauai.

REMOVAL OF CATTLE

Through the cooperation of the Haleakala Ranch, 20 head of trespassing cattle were removed from the Makawao reserve on Maui and the owners fined \$5.00 per head under the new law.

The attention of the Land Commissioner was called to the poor condition of the fence on the makai boundary of the Kuliouou reserve on Oahu, which allowed cattle to gain entrance to the reserve and he has required the holder of the adjacent government lease to make the fence stockproof.

MOLOKAI RESERVE LANDS

Acting on the recommendations in my report on acquiring certain lands in the Molokai Forest Reserve, which were approved by you, a board of appraisers, appointed by the Governor, has visited the lands and appraised them and reported to the Governor as the first step toward obtaining title to them.

NEW RESERVES

Considerable time was spent in checking the maps and descriptions of the new Waiakea and Waimanalo reserves and revised Hilo and Upper Waiakea reserves and corrections arranged for at the Survey Office preparatory to presenting them to you for approval and action by the Governor.

NUUANU ROAD TREES

Under the able direction of Commissioner W. M. Giffard, a start was made in opening up some of the views of waterfalls and mountain views by branch trimming, vine removal, and thinning among the trees which line the Nuuanu Valley road through the forest reserve. This is being done slowly and with care after each situation is studied and the best plan of procedure decided upon. The County Engineer has also been requested to save as many as possible of the trees in the process of widening this road and has promised to furnish us with his plans as soon as the surveys are completed.

HONOULIULI RESERVE

My assistant has devoted a portion of his time in field work connected with the new demarcation of the proposed Honouliuli Reserve in Ewa, Oahu, and tells of this work more in detail in his November report submitted herewith.

Respectfully submitted,
C. S. JUDD,
Superintendent of Forestry.

REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY, OCTOBER, 1922.

Honolulu, Hawaii, November 20, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir:—The following report of my activities during October, 1922, is respectfully submitted:

EDUCATIONAL COOPERATION

Four lectures on the subject of forest planting, and three demonstration periods in the field, were given to the class in Agriculture 12 (General Forestry) of the University of Hawaii during the month. In order to get practical experience the class assisted in the planning and planting of wind-breaks for the Macadomia nut plantation on Round-Top. In the lectures the principles of nursery management and forest planting peculiar to Hawaii were discussed. The ground-plan of a practical forest-tree nursery was constructed, and the actual working plan for the Piihonua planting in the Hilo Forest Reserve was studied as a model.

ROUND-TOP TRAIL AND MAP.

Several days were spent in locating and blazing a new foot-trail on Round-Top to carry pedestrian traffic around instead of through the new Macadamia nut plantation. The trail varies in grade from 15 to 20 per cent, rocky outcrops at its lower end making a uniform grade impossible. For the most part the trail traverses dense growths of lantana and occasional groves of guava or planted koa.

Some time was devoted to beginning a new plane-table map of the Round-Top area, on a scale of 200 feet to the inch, which will ultimately include the Makiki Nursery and Arboretum. Such a map is needed both in planning and in keeping records of tree groups in the Arboretum.

WAIAHOLE.

On October 13 a truck-load of trees was taken to the Waiahole planting area, among them 100 *Catalpa longissima*, which were immediately planted in a solid group near the road. In company with the Superintendent, a general inspection of the Waiahole plantings was made and several progress photographs were taken. The chaulmoogra oil trees are doing exceptionally well, the most favorable sign of their thriftiness being the total absence of the leaf drying which characterized these trees in the nursery stage of their growth. Kauri pine (*Agathis robusta*) shows a growth averaging five times as rapid on plowed and cultivated land as on neglected grass land.

VISITORS.

Mr. L. W. Bryan, Forest Ranger at Hilo, spent some time in the office discussing matters pertaining to the Hilo and Kohala Reserves on Hawaii.

Dr. Skottsberg was given assistance in making a selection from our official photographs, his interest being chiefly in pictures showing types and habitants of the native plants.

Mr. Merriam, of Brewer and Company, called to discuss plans for the extermination of wild goats on Kapapala Ranch and the surrounding country. Mr. Merriam's company is willing to make a considerable money contribution to any plan which gives reasonable hope of success.

Mr. J. Gerahty, vegetable-oil chemist of Chicago, called for information on cotton seed production in the Hawaiian Islands. I supplied him with the several publications of the U. S. Experiment Station in Hawaii on this and related subjects.

MISCELLANEOUS.

Four grass cutters, operating in trespass along the Tantalus road, were arrested by Ranger Ellis on October 14 and were given suspended sentences of 13 months each at the local police court.

On October 22 I accompanied Dr. Lyon and Ranger Bryan on a general inspection of the Manoa Arboretum of the Hawaiian Sugar Planters. The great number and variety of species being planted in this arboretum should yield much information of value within the next ten years.

On October 23 a letter was sent to a trapper-hunter in the Cascade Mountains of Washington with the object of enlisting his services in the introduction of the western meadowlark which nests in the vicinity of his home.

A conference was held with the President of the Outdoor Circle to discuss a revision of the shade tree ordinance now pending before the Board of Supervisors.

Some time was devoted to work on the photograph collection.

A tracing of the Akaka Falls Area working plan was completed during the month, and some time was given to collecting office data on the proposed Honouliuli Forest Reserve for which the field work will be undertaken in November.

Respectfully submitted,
C. J. KRAEBEL,
Assistant Superintendent of Forestry.

**REPORT OF ASSISTANT SUPERINTENDENT OF FORESTRY.
NOVEMBER, 1922**

December 18, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following statement of my activities during November, 1922, is respectfully submitted:

PROPOSED HONOLIULI RESERVE

The principal field project of the month was the general examination of the east slope of the Waianae Mountains, southward from Puu Hapapa, with a view to creating a new forest reserve in that region.

Such a reserve was planned in 1906 by the then Superintendent of Forestry, Mr. Hosmer, and a boundary embracing 5,540 acres was actually surveyed. But inasmuch as this entire area lay within the private land of Honouliuli, many difficulties prevented the culmination of the plan at that time, so that, instead of being protected as a forest reserve, the land has for a long time been leased for grazing purposes by a local ranch company. In consequence of this procedure the native forest, which originally clothed the slopes and gulches, has been greatly reduced in extent and in many places has disappeared altogether. Small springs and streams which used to run perennially in many of the gulches have been dry for years, and the whole region shows signs of gradual desiccation. Foothills and slopes with a south exposure are mostly barren of trees, while such remnants of forest as still remain are confined to the moister north slopes. The treeless areas which have good soil are possessed by a dense growth of lantana and oi; where poor soil exists even this cover is reduced to almost nothing; and both types are practically worthless for grazing. Steep slopes and ridge points are often eroded to red hardpan which supports no plant life whatever. Gulch bottoms are still filled with kukui groves, but the forest floor beneath them, instead of being overgrown knee-deep in its proper cover of luxuriant ferns and smaller plants, is carpeted with dry leaves and litter. The only service of such groves is to offer shade to cattle.

The result of this continued decrease of forage plants has been to force the cattle always higher and further back into the mountains until at the present time there is no place, excepting absolute cliffs, where the cattle have not penetrated. The best grazing today is in little grassy pockets or "hanging valleys" at the bases of the last and highest palis. Such places remain green throughout the year because they are the spots which once were the sources of springs and streams, and still receive some water in the form of drainage from the cliffs above them. The present lack of summer water from these old stream-heads is the strongest evidence of the gradual drying of the entire Honouliuli slope through loss of forest cover.

The opinion may be advanced that, because of the development of the adjacent lowland pineapple culture, it is not particularly important to have a water supply forest in this region. Only one reply need be made to this argument: it is never economic to destroy a forest when the land under that forest can not be put to a higher use. Clean fresh water is always needed, and the more dependable and abundant the supply the more stable will be the economic and natural conditions

of the country possessing that supply. Oahu is a small island; its proportion of forested mountains to agricultural lands is scarcely adequate to assure a sufficient water supply for the maximum development. The fact must be faced that our water needs are continually increasing, while by the curtailment of forest areas we are continually reducing our water producing power. It requires no great imagination to see that at no distant future time, by reason of the inevitable increase in population and increased development of every sort, we shall be using a vastly greater amount of water than we do today.

Under these circumstances it is only the course of wisdom to place under protection such potential water producing areas as the proposed Honouliuli forest reserve. It is moreover important to do this as soon as possible because of the already considerable destruction of forest in that region through years of unrestricted grazing. The greater the loss of forest growth, the longer will be the time required for complete recovery of the forest, and hence the longer we shall have to wait for results in the form of actual water production.

Just how rapidly the Honouliuli forest will recover naturally after it is protected depends upon the present condition of the various sites. In the north end, where cattle have been excluded for a number of years, koa groves are developing with surprising speed on exposed and barren ridges. Other growth is also increasing. There is no doubt that a great natural improvement in the forest will result within a very few years after the exclusion of cattle.

The field work done on the project during the past month consisted of a reconnaissance to discover old survey points and to mark with flags a preliminary boundary. More than half of the boundary has been so marked, extending from Puu Hapapa to a ridge about one-half mile south of Pohakea Pass. In locating this boundary the effort has been to make a "site division" between forest land and grazing land, i.e., to determine on the spot whether the land is more valuable for grazing or forest use. It must be appreciated that this is often difficult and that in order to reduce the number of angles, keep the boundary as simple as possible, and so keep down the cost of future fencing it becomes a give-and-take proposition.

When it comes finally to considering the acquisition of title to the forest land, or the purchase of the lease from the present lessee, there are several suggestions for appraising the land, which I shall be glad to advance at that time.

EDUCATIONAL COOPERATION

The course in general forestry (Agriculture 12) in the University of Hawaii was conducted as usual. A total of seven lectures and four field laboratory periods, covering the subjects of forest planting and mensuration, was given during the month. As a problem in mensuration the class was set the task of obtaining the volume of a quarter-acre sample plot in the *Eucalyptus robusta* forest on Tantalus Drive, with the following interesting results:

Merchantable volume in boles down to 6" top diameter, 33,600 bd. ft. per acre.

Cordwood in tops and suppressed trees, 27 cords per acre.

Total cordwood, if all cut into cordwood, 129.2 cords per acre.

The plantation is approximately thirty-four years old.

MISCELLANEOUS

Some time was spent upon the progress of the Hilo Forest Reserve working plan.

On November 7 a visit was made to the Salvation Army Boys' Home to discuss with the officers in charge the continued manufacture

of the Dower cane of representative Hawaiian woods. This is a curio cane made of bits of different colored woods grown in the Hawaiian Islands, and was originated by Captain James Dower, an old sea captain. I suggested that the Salvation Army Home develop a standard cane, limiting the woods used to species which will always be obtainable, and greatly simplifying the manufacture. The Home is not at present equipped to take up the work but has promised to do so as soon as possible.

An afternoon was spent on the Pali Road discussing with Commissioner Giffard and the Superintendent of Forestry, the problem of partial cutting of the roadside trees with the object of disclosing views of landscape which are now hidden by dense growth.

Conferences were held with the President of the Outdoor Circle and the City Engineer relative to the operation of the city ordinance relating to shade trees.

On November 13 Ranger Ellis arrested Manuel Salado of Kapahulu for cutting grass in trespass in the Honolulu Watershed Forest Reserve.

Among the visitors to the office was Miss Ruth Hoffman of the Department of Education, with an inquiry into the possibility of growing olona on a scale sufficient to supply the public schools with fibre for handicrafts work. It is Miss Hoffman's idea to displace imported handicrafts materials with native products wherever possible, and in this she was assured of hearty cooperation by the Division of Forestry.

Respectfully submitted,

C. J. KRAEBEL,

Assistant Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN, OCTOBER, 1922.

Honolulu, Hawaii, November 1, 1922.

Superintendent of Forestry,

Honolulu, T. H.

Dear Sir:—The following report gives the principal work done during the month of October:

NURSERY-DISTRIBUTION OF PLANTS

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Oahu—Sold . . . . .		....	126	126
Gratis	8,900	....	4,336	13,236
				<hr/> 13,362

SUB NURSERIES

	Seed Boxes	Transplant Boxes	Pot Grown	Total
Maui and Molokai	500	4,640	235	5,375
Kauai . . . . .		....	1,795	1,795
Hawaii		1,104	229	1,333
				<hr/> 8,503
Total for all islands				<hr/> 21,865

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of plants, Honolulu Nursery.....	\$ 3.35
Sale of plants, Hilo Nursery.....	2.00
Sale of plants, Haiku Nursery.....	10.50
To replace utensils broken at Ranger Station at Kokee Camps, Kauai . . . . .	.50
Rent of Office Nursery Grounds for August and September.....	70.00
Sale of Government Ford car, Dr. Golding, Kauai.....	150.00
Total	<u>\$236.35</u>

PRESERVATION OF FOREST RESERVES

Rent of premises at halfway house, Tantalus, for quarter ending September 30, 1922	\$ 30.00
Alfred Rocha, 2 cords of guava wood, Waiahole Forest Reserve..	5.00
Rent of premises at halfway house, Tantalus, for quarter ending December 31, 1922	30.00

BLACK SAND

30 loads of black sand taken from Makiki Valley Sand Pit at \$.50 per load	15.00
---	-------

FINES

John Kai, fine of \$40.00 for allowing eight cattle to trespass on Forest Reserve land at Laupahoehoe, Hawaii.....	40.00
Naoni, trespass on Forest Reserve land at Laupahoehoe, Hawaii, 1 cow	5.00
Manuel Silva, trespass on Forest Reserve land at Laupahoehoe, Hawaii, 2 cows	10.00
John Monte, trespass on Tantalus Ridge, 1 load of grass.....	1.00

PERMIT FEE FOR GRASS

H. Henoshita, permit to take grass from certain land in Nuuanu Valley, from July 1 to December 31, 1922.....	1.00
Total	<u>\$137.00</u>

ANIMAL INDUSTRY REVOLVING FUND

Dr. L. N. Case.....vaccine	\$ 1.50
Chas. Martin.....“	11.00
Sandwich Island Honey Co.....serum	11.00
“ “ “ “.....“	10.00
“ “ “ “.....bacterin	6.00
Kemo Farm.....serum	22.00
John A. Maguire.....bacterin	8.00
Puuwaawaa Ranch.....“	4.00
H. W. Rice.....“	28.00
Kualoa Ranch.....“	5.62
Total	<u>\$107.12</u>

MAKIKI STATION

The work done at this station consisted principally of the regular routine. A large number of trees are now on hand for the planting season. We expect also to distribute a quantity of trees for planing on the coming Arbor Day in November.

HONOLULU WATERSHED

The work done on the watershed consisted of clearing trails, making holes for trees and planting 300 Koa trees.

ADVICE AND ASSISTANCE

The writer attended the Maui Fair which took place on October 12th, 13th and 14th, for the purpose of acting as a Judge of the plants and flowers.

Requests to visit Luke Field, also Schofield Barracks have been made by the officers, for the purpose of giving advice in planting, etc. When time permits, visits will be made.

The following calls, etc., have been made at the request of people in and around the city:

Calls made	6
Advice given by telephone	10
Advice given people calling	8

Respectfully submitted,

DAVID HAUGHS,

Forest Nurseryman.

REPORT OF FOREST NURSERYMAN, NOVEMBER, 1922

December 18, 1922.

Superintendent of Forestry,
Honolulu, T. H.

Dear Sir: The following report gives the principal work done during the month of November:

NURSERY—DISTRIBUTION OF PLANTS

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Oahu—Sold	200	200
Gratis.	3,800	2,205	6,005
				<hr/> 6,205

SUB-NURSERIES

	Seed Boxes.	Transplant Boxes.	Pot Grown.	Total.
Maui and Molokai	1,581	1,296	2,877
Kauai	2,622	2,622
Hawaii	3,776	1,917	5,693
				<hr/> 11,192
Total for all Islands				<hr/> 17,397 <hr/>

COLLECTIONS—GOVERNMENT REALIZATIONS

Sale of plants, Honolulu Nursery	\$ 2.55
“ “ “ Haiku Nursery	4.60
Money advanced by Plantation Companies and Corporations for labor and material in raising seedlings, not now necessary:	
Balance at Honolulu Nursery	115.50
“ “ Haiku Nursery	98.96
“ “ Kalaheo Nursery	37.50
Rent of Office Nursery Grounds for October	35.00
Total	<hr/> \$294.11 <hr/>

PRESERVATION OF FOREST RESERVES

Permit to hunt birds on Government Forest Reserves for one year.	\$ 1.00
Manuel Salado, one load of grass from Tantalus.	1.00

BLACK SAND

34 loads of black sand taken from Makiki Valley Sand Pit at \$.50 per load	17.00
Total	\$ 19 00

MAKIKI STATION

The work done at this station consisted of the regular routine, namely, mixing and sterilizing soil, transplanting seedlings and cutting up wood for boxes.

HONOLULU WATERSHED

The work done on the watershed consisted of making trails and clearing others.

ARBOR DAY

The distribution of plants for Arbor Day, November 17, 1922, at the Government Nursery, Honolulu, amounted to 7,140, divided as follows:

General distribution	5,486
Schools	194
School children receiving one tree each	1,460

The 1921 Arbor Day distribution amounted to 6,394, there being a gain of 710 this year over last.

ADVICE AND ASSISTANCE

The writer has been called upon to make visits and otherwise give advice and assistance to people in and around the city as follows:

Calls made	6
Advice given by telephone	4
“ “ people calling	8

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY

REPORT OF ENTOMOLOGIST, OCTOBER, 1922.

Honolulu, Hawaii, December 1, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—During the month of October the insectary handled 14,400 pupae of the melon fly, from which there were bred 803 females and 753 males of *Opis fletcheri*.

The distribution of parasites was as follows:

MELON FLY PARASITES

Opis fletcheri

Oahu:	Females	Males
Dr. Bliss, Pearl City	150	150
Pearl City	200	200

FRUIT FLY PARASITES

Diachasma Tryoni

Oahu:

Mr. Raymond Brown, Manoa, Honolulu.....	280	280
---	-----	-----

Tetrastichus Giffardianus

Oahu:

Males and Females

Mr. Raymond Brown, Manoa, Honolulu.....	1,000
---	-------

The Entomologist was engaged during the month in handling the material sent in by Mr. Osborn from Mexico. Two shipments were received during the month, on the 18th and 31st insts., respectively, the first internal parasites of the pineapple mealy bug, the other lady beetles (*Scymnus* sp.) and internal parasites of a guava mealy bug. The propagation and distribution of the lady beetles and internal parasite of the avocado mealy bug also consumed much time.

Respectfully submitted,
D. T. FULLAWAY,
Entomologist.

REPORT OF ENTOMOLOGIST, NOVEMBER, 1922.

Honolulu, Hawaii, December 10, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—During the month of November the insectary handled 9,900 pupae of the melon fly, from which there were bred 1,587 females and 1,608 males of *Opius fletcheri*.

The distribution of parasites was as follows:

MELON FLY PARASITES

Opius fletcheri

Oahu:

Females Males

Dr. Bliss, Pearl City.....	450	450
----------------------------	-----	-----

FRUIT FLY PARASITES

Diachasma Tryoni

Oahu:.

Mr. M. Kawahara, Kalihi, Honolulu.....	250	200
--	-----	-----

Diachasma Fullawayi

Oahu:.

Mr. M. Kawahara, Kalihi, Honolulu.....	25	25
--	----	----

Opius Humilis

Oahu:.

Mr. M. Kawahara, Kalihi, Honolulu.....	50	50
--	----	----

Galesus Silvestrii

OAHU:

Males and Females

Mr. M. Kawahara, Kalihi, Honolulu.....	300
--	-----

Tetrastichus Giffardianus

OAHU:

Mr. M. Kawahara, Kalihi, Honolulu.....	1,100
--	-------

Nothing has been received from Mr. Osborn during the month. He has been investigating some new regions for collecting purposes and has not found it convenient to ship. He is now working under a co-

operative arrangement between the H. S. P. A. and the Board whereby we pay his salary of \$200.00 per month and they pay his expenses, which come between \$300.00 and \$400.00 per month. His two major projects at present are cutworm and wireworm enemies. Shipments made during October are still being cared for and the successful introductions of the Summer are being propagated and distributed to the fullest extent of our plant. We know definitely that three of the enemies of the avocado mealybug are propagating themselves under natural conditions. An inspection was made of the fern weevil infestation in the ditch country on Maui, where the fern weevil parasite was liberated during the Summer, but no evidence could be seen of its establishment. An additional lot of parasites was put out. The Government of Formosa has sent entomologists to Hawaii to secure the melon fly parasite for that country, and these co-workers in the entomological field are being given every possible assistance.

Respectfully submitted,
D. T. FULLAWAY,
Entomologist.

DIVISION OF PLANT INSPECTION

REPORT OF CHIEF PLANT INSPECTOR, OCTOBER, 1922

Honolulu, October 31, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen: I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of October, 1922, as follows:

During the month we boarded 62 vessels, 30 of which carried vegetable matter. Five of these vessels passed through the Canal Zone. The following disposal was made of the various shipments:

Passed as free from pests.....	2,905 lots	55,563 pkgs.
Fumigated	9 lots	9 pkgs.
Burned	91 lots	91 pkgs.
Returned to shipper	48 lots	591 pkgs.

Total inspected 3,053 lots 56,254 pkgs.

Of these shipments 55,768 packages arrived as freight, 326 as baggage and 160 as mail.

RICE AND BEAN SHIPMENTS

Rice, amounting to 23,729 bags and 1,767 bags of beans arrived from mainland ports and 1,319 bags of rice and 2,628 bags of beans from Japan and were found free from pests.

PESTS INTERCEPTED

Approximately 5,223 pieces of baggage belonging to immigrants from foreign countries were examined from which 32 lots of fruit and 49 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned material follows:

PROHIBITED MATERIAL BURNED

- 1 package plants by mail as contraband from Funchal.
- 1 lot Florida avocados in baggage, prohibited.
- 5 lots Central American bananas in baggage, prohibited.
- 2 lots five needle pine trees in baggage from Japan, prohibited.

MATERIAL FUMIGATED

- 2 coconuts from Manila by mail.
- 2 coconuts from Manila by baggage.
- 1 coconut from Florida by mail.
- 4 packages logs from Japan in cargo.

MATERIAL RETURNED

48 lots containing 591 boxes of pears from California in cargo infested with mealy-bugs, *Pseudococcus maritimus*.

BENEFICIAL INSECTS

1 box beneficial insects per S. S. Wilhelmina from Mr. Osborne, Mexico. Parasites and ladybirds for mealy-bugs.

HILO INSPECTION

Brother M. Newell, inspector at Hilo, reports the arrival of 10 vessels, 6 of which carried vegetable matter consisting of 296 lots and 4,250 packages, all passed as free from pests except 15 boxes of pears infested with mealy-bugs which were returned to the shipper. Nine thousand and sixty-four bags of rice and 229 bags of beans arrived from mainland ports and 31 bags of rice and 47½ bags of beans from Japan, all passed as free from insect pests.

KAHULUI INSPECTION

Mr. L. Gillen, inspector for Maui, reports 4 vessels arriving at the port of Kahului, 2 of which carried vegetable matter consisting of 23 lots and 2,299 packages, all passed as free from pests. Thirty-four bags of beans arrived from mainland ports.

INTER-ISLAND INSPECTION

57 steamers were attended to plying between islands.

Passed as free from pests		Rejected	
Taro	643 packages	Fruit	2 packages
Vegetables	43 "	Plants	2 "
Fruit	227 "		
Plants	66 "	Total	4 "
Seeds	12 "		
Pineapple shoots	12,678 bags		
Sugar cane	7 cases		

13,676

LOCAL FUMIGATION

During the month we fumigated the following for various people: 445 bags of grain.

Respectfully submitted,
E. M. EHRHORN,
Chief Plant Inspector.

REPORT OF CHIEF PLANT INSPECTOR, NOVEMBER, 1922.

Honolulu, Hawaii, November 30, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I herewith submit my report of the work carried on by the Division of Plant Inspection for the month of November, 1922, as follows:

During the month we boarded 46 vessels, 22 of which carried vegetable matter. Six of these vessels passed through the Canal Zone. The following disposal was made of the various shipments:

	Lots	Packages
Passed as free from pests.....	2,338	49,438
Fumigated	1	1
Burned	120	120
Returned to shipper.....	9	43

Total inspected	2,468	49,602
---------------------------	-------	--------

Of these shipments 49,080 packages arrived as freight, 397 as baggage and 125 as mail.

RICE AND BEAN SHIPMENTS

Thirty-one thousand five hundred and fifty-four bags of rice and 744 bags of beans arrived from mainland ports and 4,463 bags of rice and 2,297 bags of beans from Japan and were found free from pests.

PESTS INTERCEPTED

Approximately 4,261 pieces of baggage belonging to immigrants from foreign countries were examined from which 70 lots of fruit and 42 lots of vegetables were seized and destroyed. A tabulated list of material intercepted other than the above mentioned material follows:

From China:

1 pomelo infested with *Parlatoria ziziphus*.

From Japan:

1 lot sandpears infested with *Lepidosaphes ficus*.

From New Zealand:

1 lot N. Z. flax infested with *Trionymus phormii*.

PROHIBITED MATERIAL BURNED

2 lots plants in baggage from Australia.

1 lot tree seeds by mail from Germany.

3 lots plants in baggage from Japan.

1 lot ginger plants in baggage from Panama, prohibited.

1 lot N. Z. flax in baggage from New Zealand, prohibited.

1 avocado in baggage from mainland, U. S., prohibited.

MATERIAL FUMIGATED

1 package tree seeds by mail from Ecuador under Permit No. 30, Federal Horticultural Board.

MATERIAL RETURNED

6 lots containing 40 cases of pears from California in cargo infested with mealy-bugs, *Pseudococcus maritimus*.

1 coconut heart from Samoa in baggage, prohibited.

1 lot aligator pears from Samoa in baggage, prohibited.

100 roses from California by express infested with Scale insects.

HILO INSPECTION

Brother M. Newell, Inspector at Hilo, reports the arrival of 8 vessels, 5 of which carried vegetable matter consisting of 267 lots containing 3,328 packages, all passed as free from pests. Eight thousand six hundred and fifty bags of rice and 82 bags of beans arrived from mainland ports and 675 bags of rice and 523 bags of beans from Japan, all passed as free from pests.

KAHULUI INSPECTION

Mr. L. Gillin, Inspector for Maui, reports 5 vessels arriving at the port of Kahului, 3 of which carried vegetable matter consisting of 21 lots containing 1,878 packages, all passed as free from pests. Two thousand eight hundred and sixteen bags of rice and 90 bags of beans arrived from mainland ports.

INTER ISLAND INSPECTION

49 steamers were attended to plying between islands.

Passed as free from pests		Rejected	
Taro	596 bags	Fruit	2 packages
Vegetables	67 packages	Plants	6 "
Fruit	227 "		
Plants	116 "	Total rejected...	8 "
Seeds	10 "		
Pineapple shoots....	2,000 bags		

Total passed....3,016

LOCAL FUMIGATION

During the month we fumigated the following for various people:
 426 bags of grain.
 1 lot furniture.
 21 cases of museum specimens.

Respectfully submitted,
 E. M. EHRHORN,
 Chief Plant Inspector.

DIVISION OF ANIMAL INDUSTRY

REPORT OF TERRITORIAL VETERINARIAN, OCTOBER, 1922.

Honolulu, Hawaii, November 1, 1922.

Board of Commissioners of Agriculture and Forestry,
 Honolulu, T. H.

Gentlemen:—I beg leave to submit the following report for the month of October:

TUBERCULOSIS CONTROL

The work in this line was confined to the testing of a few head of cattle imported from the mainland.

SORE-HEAD VACCINE IN CASES OF ROUP

A difference of opinion exists as to whether or not contagious epithelioma or sore-head and roup are different manifestations of the same disease or distinctly separate diseases.

I have, for a considerable time, regarded them as one and the same disease, the symptom complex changing according to whether the lesions were external or internal. Individuals are frequently found exhibiting both types of lesions.

Having attained considerable success in treating cases of sore-head proper with my new vaccine, I determined on a few experiments on cases of so-called roup and some cases where sore-head and roup were combined in the same individual. The results of these experiments have been highly satisfactory and while it is yet too early to draw any definite conclusions, I am of the belief that roup is amenable to treatment by vaccination and that the two conditions are caused by essentially the same bacterial flora. Cases of roup, however, respond less quickly

to vaccination. That is to say, that while cures can be affected in the majority of cases where treatment is undertaken in the early stages of the disease, a longer time and more frequent vaccinations are necessary. In this as in other diseases where vaccination is used in treatment, the results will largely depend upon the vitality of the patient and stages of the disease at the time of presentation for treatment.

IMPORTATION OF LIVE STOCK

The live stock inspector reports the boarding and inspection of 100 vessels during the past month, of which number the following carried live stock for this port:

October 3—S. S. Manukai, San Francisco: 2 Hereford bulls, C. H. Bellina; 1 dog, 1 Holstein bull, Schuman Carriage Co.

October 3—S. S. Wilhelmina, San Francisco: 2 dogs, C. E. Drake; 1 dog, Chief Big Tree; 14 monkeys, E. K. Fernandez; 81 crates poultry, various.

October 5—S. S. China, Hongkong: 1 dog, B. O. Higdon; 2 crates chickens, Market Sporting Goods Co.

October 7—S. S. Makura, Sydney: 1 crate chickens, Geo. Lishman.

October 9—S. S. Hwah Ping, Hongkong: 1 dog, W. W. Jarret; 1 dog, Capt. Ole Erickson.

October 9—S. S. Lurline, San Francisco: 36 crates poultry, various.

October 10—S. S. Matsonia, San Francisco: 1 dog, Capt. R. H. Dixon.

October 16—S. S. Ginyo Maru, Kobe: 2 crates poultry, K. Tsume.

October 18—S. S. Manoa, San Francisco: 2 dogs, A. Magoon; 1 dog, Corporal P. Borsky; 122 crates poultry, various.

October 20—S. S. Hyades, San Francisco: 18 cows, 3 calves, C. H. Bellina; 2 Jersey heifers, 1 Jersey bull, Leahi Home; 1 cow and calf, Mrs. John Waterhouse; 3 crates turkeys, American Factors.

October 24—S. S. Maui, San Francisco: 1 dog, Dr. W. Lam.

October 28—S. S. Makura, Vancouver: 1 Persian cat, Mrs. Humphrey.

October 29—U. S. A. T. Meigs, San Francisco: 156 mules, U. S. Q. M. Dept.

October 30—S. S. Manulani, San Francisco: 44 crates poultry, various.

October 31—S. S. Wilhelmina, San Francisco: 2 dogs, W. Rosa; 1 dog, W. A. Low; 1 dog, A. T. Knight; 1 dog, H. F. Tate; 1 dog, H. G. Travis; 126 crates poultry, various.

MAUI, KAUAI, HAWAII

Reports from the other islands state that no outbreaks of disease among live stock have occurred.

Respectfully submitted,

LEONARD N. CASE,

Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN, OCTOBER, 1922.

Honolulu, Hawaii, November 1, 1922.

Dr. Leonard N. Case,

Territorial Veterinarian,

Board of Agriculture and Forestry,

Honolulu, T. H.

Dear Sir:—I beg to submit the following report of my activities for the month of October, 1922:

TUBERCULOSIS CONTROL

During this month the following cattle were tuberculin tested at the Animal Quarantine Station:

	Cows	Bulls	Heifers	Total	Passed	Condemned
Schuman Carriage Co. . .	1	..	..	1	1	0
John Waterhouse	1	..	..	1	1	0
C. H. Bellina	18	2	..	20	20	0
Leahi Home	1	..	2	3	3	0
Total				25	25	0

All these animals were imported from the mainland.

The three head for Leahi Home being pure-bred registered Jerseys, of particularly good type.

RABIES CONTROL

The following dogs were given the anti-rabies, 1 injection treatment:

C. H. Bellina	1 dog
Chief Big Tree	1 dog
Mr. Higdon	1 Chow pup
W. W. Jarret	1 Chow pup
Capt. Erickson	1 Chow pup
Mrs. Alfred Magoon	2 Pointer dogs
Corporal P. Borsky	1 dog
Dr. W. Lam	1 Pointer pup

Total 9 dogs

INSPECTIONS

A tour of inspection of hog premises on Kamehameha IV Road and Kemoo Farm was made the early part of this month.

Twenty establishments on Kamehameha IV Road were visited. The large majority of these places were found to be in a very filthy and unsanitary condition. The houses in most instances being badly constructed and with insufficient light. In many instances the sewage was permitted to run all over the place, through adjoining premises and into the public highways. A condition which in the event of an outbreak of a contagious disease would make it exceedingly difficult to control.

The Kemoo Farm establishment was in fair condition. Several suggestions as to improvements were made.

POULTRY DISEASES

Several head of poultry belonging to various owners were brought to the Quarantine Station suffering from roup or the catarrhal form of sore-head. These were treated by vaccination and all returned cured with the exception of two head that died.

Respectfully submitted,

L. E. CASE,

Assistant Territorial Veterinarian.

REPORT OF ASSISTANT TERRITORIAL VETERINARIAN, NOVEMBER, 1922.

Honolulu, Hawaii, December 23, 1922.

Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—I beg to submit the following report of the activities of this department during the month of November, 1922:

TUBERCULOSIS CONTROL

The following cattle were given the intradermal tuberculin test:

	Tested	Passed	Condemned
Kualoa Ranch	196	195	1
John Teixeira	6	6	0
Waialae Ranch	14	14	0
M. Salado	6	6	0
Total	222	221	1

RABIES CONTROL

The following dogs were received at the quarantine station and treated with anti-rabies vaccine-one-injection method:

Capt. A. T. Knight, 1 black dog.
 Capt. H. F. Tate, 1 Airedale.
 Capt. L. R. Travis, 1 Collie.
 W. A. Low, 1 fox terrier.
 Wm. Rosa, 2 white bull terriers.
 W. H. Bromley, 1 Airedale.
 M. E. Corey, 1 bull dog.
 H. L. Coates, 1 terrier.
 C. King, 1 Airedale pup.
 J. A. Garvie, 1 Airedale pup.
 T. O. Kasaki, 1 pointer.

All the above dogs withstood the vaccination successfully and were delivered to their owners in good condition.

SORE-HEAD TREATMENTS

During this month nine head of poultry, white leghorns, were brought to the quarantine station suffering from the catarrhal form of sore-head. They were treated with the sore-head vaccine produced by this office.

One small chicken died and one hen lost the sight of one eye. These birds were badly affected. All others made perfect recoveries and were returned to their owners.

IMPORTATION OF RAMS

During the month 102 head of rams were received from New Zealand consigned to the Parker Ranch. Due to the fact that the consignee had failed to procure the necessary permit from the United States authorities for the importation of these rams, it was necessary to land them in quarantine until such permit could be obtained.

The rams were held in quarantine for two weeks and then given a dip. On the day following the dipping one ram died. Post-mortem showed pneumonia as the cause. They were then held for one additional week.

CONTAGIOUS ABORTION-BOVINE

This disease is quite prevalent among the dairy cattle of this island and causes considerable loss in milk and calf crop.

A good deal of time this month was given to the investigation of this disease and study of the latest methods of controlling it.

LIVE STOCK IMPORTATIONS

During the month 85 vessels were boarded and inspected, of which number 13 carried live stock to this port as follows:

S. S. Matsonia, San Francisco: 1 dog, R. J. Kilpatrick.
 S. S. Korea Maru, Hong Kong: 1 dog, J. K. Hart.
 S. S. President Lincoln, Hong Kong: 6 crates poultry, M. Nosaka.
 S. S. Roxen, Australia: 102 rams, Parker Ranch.
 S. S. Niagara, Australia: 3 dogs, W. C. Makay.

S. S. City of Los Angeles, Los Angeles: 5 goats, M. V. Hardy; 1 dog, Helen Kimball; 14 chickens, H. L. Chang.

S. S. Manoa, San Francisco: 1 dog, W. H. Bromley; 1 dog, M. E. Corey; 1 dog, H. L. Coates; 1 dog, L. C. King; 1 dog, J. A. Garvie; 162 crates poultry, various.

S. S. Maui, San Francisco: 1 crate poultry, A. R. X.; 1 cat, Mrs. Sam Walker.

S. S. Shinyo Maru, Orient: 1 dog, T. Okazaki.

S. S. President Pierce, Orient: 3 dogs, E. A. Silagi.

S. S. Hyades, Los Angeles: 42 mules, Schuman Carriage Co.

S. S. Hyades, Los Angeles: 307 swine, E. C. Winston.

S. S. Hyades, Los Angeles: 1 crate pigeons, E. F. Roward.

S. S. Lurline, San Francisco: 1 dog, Miss N. A. Rhodes.

S. S. Lurline, San Francisco: 94 crates poultry, various.

S. S. Wilhelmina, San Francisco: 85 crates poultry, various.

HEMORRHAGE SEPTICEMIA

Dr. J. C. Fitzgerald, Maui, reports as follows:

A small outbreak of hemorrhage septicemia among cattle on the Haleakala Ranch. Two hundred and thirty-six head of young stock vaccinated.

TUBERCULOSIS CONTROL

	Tested	Passed	Condemned
Mr. W. F. Pogue	23	23	0

Reports from other deputies showed no outbreaks of contagious and infectious diseases.

No report was received from the Deputy Veterinarian on Kauai.

Respectfully submitted,

L. E. CASE,

Assistant Territorial Veterinarian.

BY AUTHORITY

FOREST RESERVE HEARING

Notice is hereby given that under the provisions of Chapter 37, R. L. H. 1915, a public hearing will be held by the Governor of the Territory of Hawaii and the Board of Commissioners of Agriculture and Forestry on Friday, the 29th day of December, 1922, at 2 o'clock p. m. in the office of said Board at the Government Nursery, King Street, Honolulu, to consider the defining of the limits, the modification of boundaries, the withdrawal of land from forest reserves, and the setting apart as forest reserves of portions of certain government and other lands, more particularly as follows:

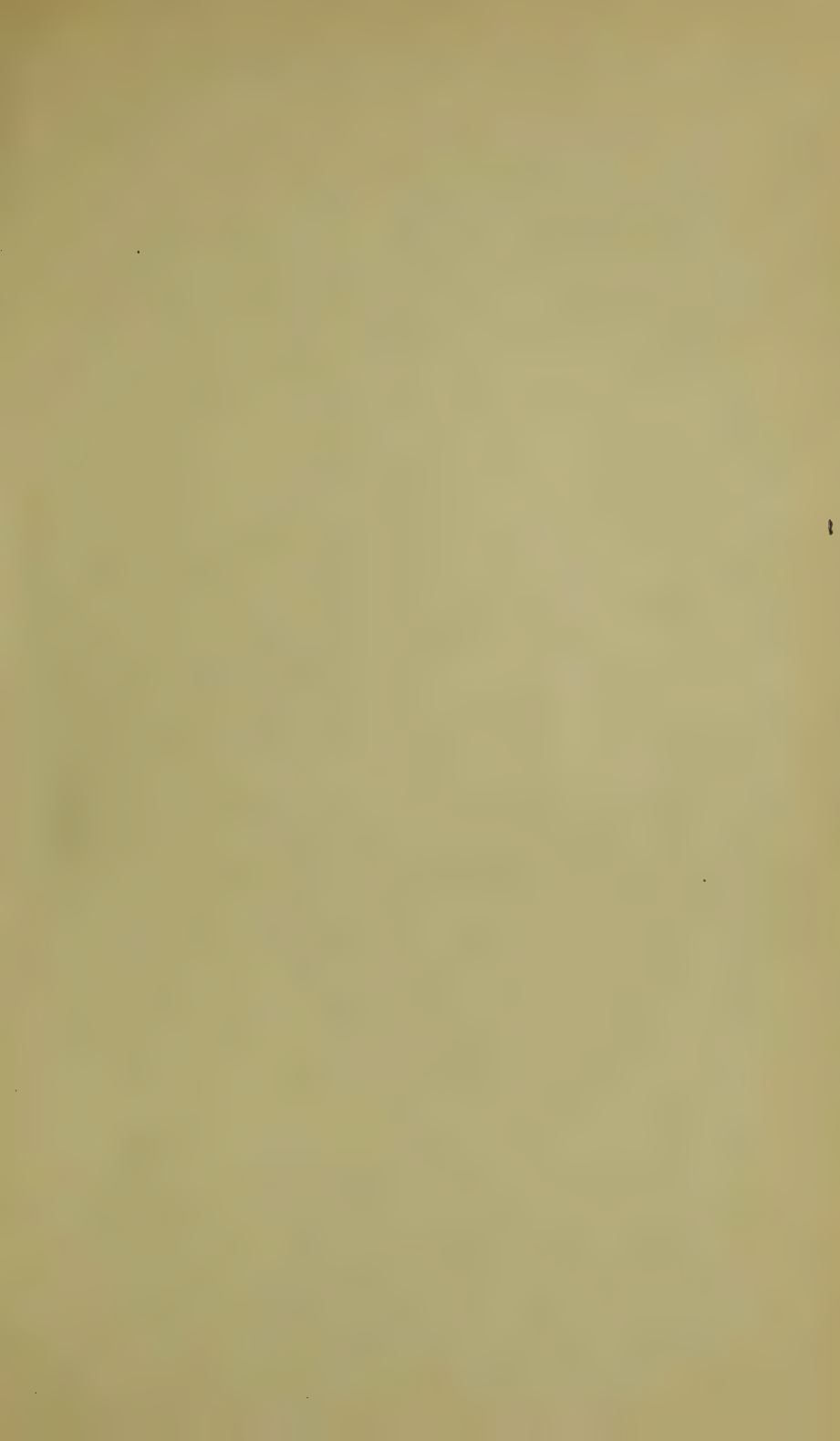
1. Island of Oahu, District of Koolaupoko, portions of the lands of Kaneohe, Kailua, Waimanalo, and Maunaloa (Waimanalo Reserve); area, 3,349 acres.
2. Island of Hawaii, District of South Hilo, portion of the land of Waiakea (Waiakea Reserve); area, 11,660 acres.
3. Island of Hawaii, District of South Hilo, revision of the Upper Waiakea Reserve; area, 62,862 acres.
4. Island of Hawaii, Districts of North and South Hilo, revision of the Hilo Reserve; area, 111,750 acres.
5. Island of Kauai, District of Waimea, withdrawal from the Puukapele and Na Pali-Kona Reserves of 715 acres.

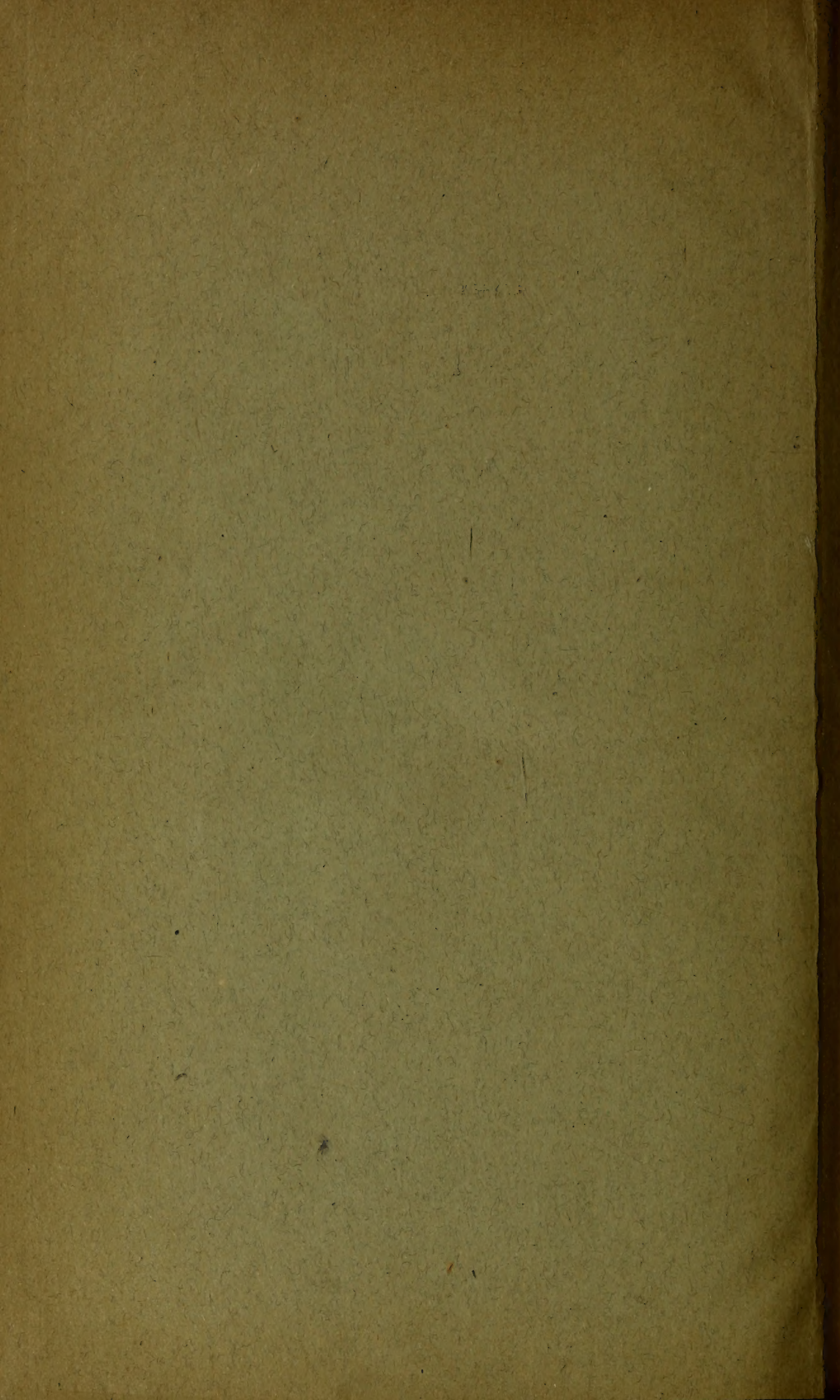
Maps and descriptions of the said lands are on file in the office of the Superintendent of Forestry where they are open to the inspection of the public. At the said time and place all persons who so desire will be given full opportunity to be heard upon the subject matter of this notice and to present evidence and arguments in person, by proxy, or by letter, either for or against the setting apart of said lands as forest reserves or the changes in the existing reserves.

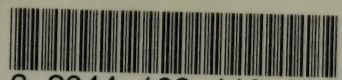
W. R. FARRINGTON,

Governor of Hawaii.

Executive Chamber, Honolulu, T. H., December 15, 1922.







3 2044 103 119 996

